FISCAL RESEARCH CENTER

Informing Lottery Budget Decisions: HOPE and Pre-K

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Georgia State University | ANDREW YOUNG SCHOOL OF POLICY STUDIES

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Executive Summary

Introduction

Georgia was a pioneer in providing a universal but voluntary Pre-K program for 4-year olds and in establishing the HOPE program, a merit-based post-secondary scholarship and grant program. These programs are funded from Georgia Lottery revenue. However, there is little evidence to suggest that the allocation of Lottery revenue is driven by consideration of what the two programs accomplish. Performance-based budgeting would indicate that a desirable allocation of funds between the two programs would consider the objectives of each program (Pre-K and HOPE) and how different allocations of lottery revenue would affect the achievement of these objectives. This report discusses these two programs and presents information that would better inform that allocation decision.

Descriptions of HOPE and Pre-K Programs

The HOPE (Helping Outstanding Pupils Educationally) program is actually comprised of several programs, the largest of which (in terms of expenditures) are the HOPE Scholarship and HOPE Grant programs. In FY 2011, $206.3 million was allocated for HOPE Grant program and $533.9 million for the HOPE Scholarship program.

The HOPE Scholarship is a merit-based scholarship program with specific academic and grade point average requirements. The HOPE Grant is a grant program for eligible students seeking a technical certificate or diploma from a Technical College System of Georgia institution or University System of Georgia System institution. Both programs pay tuition, plus a book and fee allowance. (For private colleges and universities the program pays $2,000 for full-time enrollment per semester.) To be eligible a student must be a Georgia resident, enrolled in an eligible institution, and maintain a 3.0 grade point average for the Scholarship program and maintain satisfactory academic progress for the Grant program.

Initially, the Scholarship paid tuition for only two years of college (expanded to four years in 1995) for students from families with an income of less than $66,000 (the income cap was eliminated in 1996). Students were required to apply for Pell

grants, with the Pell award deducted from the HOPE Scholarship; this provision was dropped in 2000.

Georgia's Pre-K program is a full day (6.5 hours) five days per week for 36 weeks of appropriate educational/instructional services for eligible four-year-old children. The Pre-K program began as a pilot program serving 750 at-risk four-year-olds in 1992. In 1993, the lottery-funded Pre-K program was established and served 9,000 at-risk children in its first year. In FY 1996 the Pre-K program was opened as a voluntary program to all four-year-old children.

For FY 2011 appropriation for the Pre-K program was $355,534,479, which funded 84,000 slots. For 2009-10 the total lottery allocation to Pre-K providers averaged $4,167 per child. Eligible providers include public schools (including charter schools, technical colleges, and University System schools), both nonprofit and for-profit private schools, and military bases. The current, non-duplicative waiting list numbers in excess of 10,000 students.

Program Objectives

The first step in informing the trade-off between the two programs is to identify the objectives of the programs since they determine how to measure the benefits of the programs. There are many objectives that have been attributed to the programs, but based on public statements of Governor Miller, meetings with the Advisory Committee established for this project, and conversations with individuals associated with various aspects of the HOPE and Pre-K programs, we identified the following set of objectives.

HOPE

The objectives for the HOPE Grant program are similar to those for the HOPE Scholarship program. And, thus we discuss the objectives for both programs.

1. Increase student achievement in high school and college.

2. Increase the percentage of Georgia high school graduates who go on to college.

3. Increase the quality of Georgia's workforce.

4. Increase the percentage of the "best and brightest" students who stay in Georgia to go to college.

Pre-K

1. Increase accessibility to quality early learning for Georgia's four-year-olds.

2. Increase accessibility to quality early learning for Georgia's at-risk four-year-olds.

3. Improve school readiness by improving cognitive, social, and interpersonal skills.

4. Increase academic success in first, second, and third grades, in reading and in math.

5. Increase long-term social and academic performance.

Evidence on the Effects of HOPE and Pre-K

Performance-based budgeting requires knowing how different allocations of Lottery revenue would affect the achievement of the programs' objectives. To inform the trade-off existing research was reviewed.

HOPE

In this section we provide a summary of the existing empirical evidence on the effect of HOPE, or HOPE-like programs in other states, on measures of the objectives of HOPE. Studies included in the review take into account the empirical problem of separating the effect of financial aid from the effect of other observed and unobserved factors. There are two general approaches that are used to address this empirical problem. One approach is to compare the behavior of students pre- and post-HOPE. The other approach is to compare pre- and post-HOPE changes in the behavior of Georgia students to changes in behavior of a control group, for example students in other states.

1. Effect on academic performance in high school and college.

Three studies, Turner (2003), Henry and Rubenstein (2002), and Cornwell, Lee, and Mustard (2005) explore the effect of HOPE on high school performance. The studies generally find evidence that HOPE has led to higher grades in high

school, but no evidence of increases in enrollment in more academic courses. We found no studies that looked at the effect of HOPE on other measures of high school performance, such as completion rates or time spent on school work.

There are three studies of the effect of HOPE on academic performance in college, Cornwell, Lee, and Mustard (2006), Cornwell, Lee and Mustard (2005), and Henry, Rubenstein, and Bugler (2004a). These studies find some improvement in college academic performance, but also find evidence of strategic course-taking behavior that appears to be aimed at maintaining HOPE eligibility rather than improving academic performance.

In summary, there are few studies on the effect of HOPE on academic performance, and most of those studies suffer from methodological limitations.

2. Effects on the percentage of high school graduates who go on to college.

In the first study of HOPE Scholarship's effect on enrollment Dynarski (2000) estimates that the college attendance rate among all Georgia 18- to 19-year olds increased by 7.0 to 7.9 percentage points as a result of HOPE. A 7.0 percentage point increase translates into an estimate that about 20 percent of the post-HOPE college enrollment of 18-19 year olds is due to HOPE.

Dynarski (2004) examines the effect of HOPE on school choice. Her results indicate that HOPE appears to increase the probability of attendance at four-year public institutions substantially, by between 4.5 percentage points to 8.4 percentage points. Cornwell, Mustard, and Sridhar (2006) find a similar positive impact on total college enrollment due to HOPE. There is mixed evidence on the differential impact of HOPE on the attendance of minority and non-minority students.

Attendance at 2-year public schools saw a drop in attendance rate of 1.7 to 5.5 percentage points due to HOPE, according to Dynarski (2004). This finding differs from that of Cornwell, et al. (2006). We were unable to identify any empirical research that specifically addressed the effect of the HOPE Grant on enrollment in technical colleges.

In summary, the literature is very consistent that increases in student aid, whether merit based or need based, and reductions in tuition result in an increase in enrollment rates. It seems reasonable, based on the existing work to conclude that

HOPE increased enrollment rate of Georgia students in Georgia colleges by 6 to 8 percentage points. Furthermore, the research supports the position that the increase in enrollment was due in part from a decrease in the percentage of Georgia high school graduates who attend college out-of-state.

3. Effect on the quality of Georgia's workforce.

Increased education level increases the quality of the workforce. So, to the extent that HOPE has increased post-secondary education, it has improved the workforce. However, if these graduates leave the state, then there has been no improvement in the workforce.

We know of no study that has considered the effect of receiving a HOPE Scholarship on the decision to remain in Georgia after completing college. However, there are two studies that have addressed the question more generally and that control for the likelihood that students who attend college out-of-state are predisposed to live out-of-state.

Hickman (2009) investigated the effect of the introduction of Florida's merit scholarship program in 1997 on the retention of students in Florida. He finds that the scholarship program increased the probability that a high school graduate located in Florida after graduating from a Florida college by 3.4 percentage points. A study by Groen (2004) estimates, after controlling for the student's propensity to live in another state and individual characteristics, that attending college in-state increases the probability of living in-state by 10 percentage points over those who attend college out-of-state. However, for students who attend public colleges, the difference is 15 percentage points.

The limited evidence suggests that there is a causal effect of attending college in the state of residence on living in that state after graduation. Thus, the increased incentive due to HOPE to go to college in Georgia has likely increased the number of college graduates who choose to live in Georgia rather than move to another state.

4. Effect on increasing the "best and the brightest" in Georgia colleges.

There is evidence that HOPE has increase the percentage of the better high school graduates who attend college in-state. Cornwell and Mustard (2002) find

evidence that since HOPE was adopted student quality and college selectivity has increased. Five years after the inception of HOPE the average SAT score for Georgia college freshmen rose 50 points versus the national average of 20 points.

Pre-K

There is a voluminous literature that addresses the effects of early childhood programs. However, much of it is largely descriptive in nature and does not measure the causal effects of such programs. Most of the studies are evaluations of specific programs and results cannot be generalized to other programs because of differences in programs characteristics. Finally, there are very few studies of the effect of Georgia's Pre-K program.

Measuring the effects of Pre-K on academic success is difficult due to the selection effect. If parents who enroll their children in Pre-K make greater investments in their children's academic success relative to those parents who do not enroll their children, then a simple comparison of average scores of the two groups will overstate the benefits of Pre-K.

1. Effect on accessibility to quality early learning of Georgia's 4-year-olds.

We found no studies that explored the effect of the establishment of Georgia's Pre-K program on enrollment in early learning programs. Clearly, enrollment in the Pre-K program has increased steadily over the years, and currently about 53 percent of the 4-year-olds in Georgia are in the Pre-K program. But, some of the enrollment could be diversions from other preschool programs.

In the Pre-K literature, access is often given in terms of the percentage of 4-year-olds enrolled. According to the National Institute for Early Education Research, Georgia comes in third (behind Oklahoma at 71 percent and Florida at 67 percent).

2. Effect on accessibility to quality early learning of Georgia's at-risk 4-year-olds.

Measuring the accessibility of at-risk 4-year-olds is even more difficult as we have no measures of the numbers of at-risk 4-year-olds either current or prior to the establishment of the Pre-K program. We observe that the number of at-risk students enrolled in Georgia Pre-K has increased from 25,711 in 2001-02 to 41,095 in 2008-

09 and the percentage of Pre-K students who are at-risk has increased over that same period from 40 percent to 53 percent.

3. Effect on school readiness by improving cognitive, social, and interpersonal skills.

Substantial research shows that Pre-K programs increase school readiness in terms of cognitive skills. A good example is the Gormley, et al. (2008) study of the Tulsa Pre-K program that showed increases in pre-reading, pre-writing, and pre-math skills for participants. This study indicated greater success from the state-funded Pre-K program relative to the Head Start program, especially for minorities. Research into the impacts of Georgia's program (see Henry, et al. 2004b) indicates that the state-funded Pre-K students started with cognitive scores below those of children in non-state funded private preschool, but narrowed or eliminated the gap in expressive language and cognitive/problem solving skills by the end of first grade. Georgia Head Start children, in contrast, began preschool with gaps in the four assessment categories and ended first grade with the gaps even wider in three categories.

Some of the literature on the impact of Pre-K programs comes from programs that were aimed specifically at at-risk children. The best-known example is of course the Perry Preschool Program that targeted disadvantaged children with low IQ scores from families of low socioeconomic status in Ypsilanti, Michigan. This model program began treatment at age three years and had several features not shared by state-wide Pre-K programs. The positive and long-lasting effects of this program are discussed in the full report.

4. Effect on academic success in first, second, and third grades, in reading and in math.

The model programs have generally shown evidence of persistent positive effects, and other work shows persistent beneficial effects of Pre-K. Results for Head Start suggest short-term positive impact for three- and four-year-olds in cognitive development (Ludwig and Phillips 2007; U.S. Department of Health and Human Services 2005). Pre-reading, pre-writing, vocabulary, and parent reports of children's literacy all showed small to moderate statistically significant positive effects of preschool intervention.

Henry et al. (2004b) looks specifically at the Georgia preschool system's impact on children's development through the first grade. The study compares four-year-olds enrolled in Georgia Pre-K with those attending Head Start, those attending private preschools, and in the last year kindergarteners who received no formal preschool education. Results indicate that when compared to national norms, the overall skill set of Georgia children improved over the 2001-2004 time period.

The Henry el al. study describes all children within the sample and their relation to national averages in four separate categories: receptive language skills, letter-word recognition, expressive language skills, and problem solving ability. By the end of kindergarten scores improved, but by the end of first grade scores, on average, had declined again. Problem solving skills saw continuous gains throughout the study.

The authors found evidence that individual and family characteristics influence outcomes. For example, those children whose mother had a college education scored on average 14.3 points higher in receptive language categories than children whose mothers hadn't graduated high school. Lower-income children also fared worse than their counterparts in most categories. TANF recipients recognized fewer letters, were rated less school ready, had lower levels of cognitive development, and were more likely to repeat kindergarten than their wealthier counterparts.

Results from both model programs and large-scale programs show Pre-K programs reduce the percentage of special need students. Both the Chicago Child-Parent Center Program, which is a large-scale publicly funded program offering education, family and health services, as well as the Abecedarian program, a program aimed at multi-risk African American families implemented in North Carolina during the 1970s, indicated lower rates of take up for special education services.

Ample evidence exists in the literature to indicate that participants in preschool see lower rates of grade retention. A recent example is the study by Temple and Reynolds (2007) on the Chicago CPC Program; the authors also find evidence that children who spent more time in the program showed larger impacts.

5. Effect on long-term social and academic performance.

The research on long-term social and behavioral outcomes shows more mixed results. Analyses of model programs such as the Perry Preschool Program indicate marked success in reducing delinquency and criminal behavior, particularly among the male participants (Belfield et al. 2006). Belfield et al. (2006) calculate the undiscounted value of crime cost savings in year 2000 dollars. The cost of crime up to age 65 for treated-group males totaled $1 million while the total for untreated-group males reached $1.8 million - a savings of $800,000.

A counter finding comes from the Abecedarian program (Barnett and Masse 2007; Heckman and Masterov 2007). This study found no significant impacts of treatment on criminal behavior.

Studies of participants of the Chicago Child-Parent Center program also record reductions in juvenile delinquency (Adams et al. 2004; Loeb et al. 2007; Mann and Reynolds 2006; Temple and Reynolds 2007). Those treated had lower rates of juvenile and violent arrests than their counterparts. Other research has found no significant difference in behavior; Gilliam and Zigler (2000) conduct a meta-analysis of state-funded programs from 1977 to 1998 and find that most did not produce statistically significant effects on crime.

Options for Increasing and Decreasing Funding

There are many ways the two lottery programs could be changed if there were substantive changes to funding. Given current lottery revenue, it seems most likely that available revenue will not keep up with increases in HOPE awards so that reductions are more likely. Thus, here we list only options for reducing spending; possible program increases are discussed in the full report.

The following are possible changes to HOPE if less funding is available:

1. Eliminate payment for fees and the book allowance.

2. Increase the required GPA for a full scholarship; a variation is to allow fractional scholarships for students with lower GPAs.

3. Require that students who lose HOPE in the first year repay some portion of the scholarship, essentially converting it to a forgivable loan.

4. Reduce the College Opportunity Grants.

5. Limit the scholarship to some percentage of tuition or fixed dollar amount.
6. Limit the scholarship to three years, or two years.
7. Impose an income cap, perhaps on a sliding scale.
8. Require Pell applications and reduce HOPE by the Pell grant.

The following are possible changes for the Pre-K program if less funding is available:

1. Limit eligibility to children from families below a certain income.
2. Impose tuition, on a sliding scale, to cover part of the program's cost.
3. Reduce the number of slots or the funding per slot.

Note that these possible changes in HOPE or Pre-K are just that, possibilities, and not recommendations.

The Effect of Changing Funding for HOPE and Pre-K

Based on the literature that we reviewed we discuss the likely effect of changing funding for the HOPE and Pre-K programs. We consider only those changes that would have a large effect on expenditures. The options considered should not be taken as recommendations for those changes.

HOPE

Consider first two changes, namely, reduce the required GPA and expand the need-based aid program. The effect on student achievement would likely be minimal. First, the research suggests that the effect of HOPE on student achievement is small. Second, under the current 3.0 GPA requirement, it is likely that students close to the cutoff work harder to get and keep a B average. If the required GPA was reduced to, say 2.75, then students close to that cutoff would be the ones to work harder while students near a B average might relax some. Note there is no empirical evidence on this. Reducing the required GPA will encourage some of the newly HOPE-eligible students who would have otherwise gone to college out-of-state to attend college in state. There is no definition of "best and brightest," but if one defines it as students with at least a high GPA of B or better, then by definition there should be no effect on

the retention of the "best and brightest." We have no way of determining the magnitude of the effect on the decision to attend college in-state rather than out-of-state.

A need-based aid program provides no incentive to perform better. There might be some effect of a need-based aid program on the retention in Georgia of top students, but it is expected to be small since we don't expect that many students eligible for need-based aid would be able to go to college out-of-state without substantial aid from the host college. Thus, there would not be a large number of students to entice back to Georgia.

Dynarski (2000; 2004) estimates that HOPE increased college attendance among 18-19 year olds by 7 to 8.6 percentage points, and that this was 20 percent of post-HOPE enrollment. For the period of her data, about 80 percent of enrollees were HOPE eligible, it follows that the increase in enrollment of HOPE eligible students was about 25 percent. If we had data on the distribution of GPAs, we could apply this percentage increase in order to obtain an estimate of the increased enrollment due to the reduction in GPA requirements. A similar exercise using the Cornwell, Mustard, and Sridhar (2006) estimate would provide a somewhat smaller estimated increase.

If funds for HOPE were to decrease, the three most likely significant changes would be to increase the required GPA to earn and retain HOPE, to reduce the size of the award for both the Scholarship and Grant programs, or reduce the Scholarship or Grant by the amount of the Pell Award. Increasing the minimum GPA would have just the opposite effect on academic performance and enrollment from reducing the required GPA.

Reducing the size of the scholarship will reduce the incentive to earn and maintain a 3.0 GPA, but given the findings reported above, we do not think the effect will be large. It will likely reduce the number of B+ students who stay in state rather than attending college out-of-state, although we are not able to predict by how much.

Based on existing research, we expect reducing the Scholarship would reduce the number of students who attend college. If HOPE increased enrollment by 25 percent, we expect that a cut of, say, 20 percent in the magnitude of the scholarship, will reduce enrollment by less than 20 percent of the 25 percent increase due to the

full scholarship. Our reasoning is that the marginal effect on the likelihood of enrollment of another dollar of student aid will get smaller as the size of the scholarship increases. We expect the number of student enrollment in technical colleges to decrease if the size of the HOPE grant was reduced, but there is no existing research that allows us to provide an estimate.

There has been no research on what happened to the enrollment rate of Pell students when the HOPE program changed so that a Pell Award was no longer deducted from the HOPE award. However, research on the effect of aid and tuition on enrollment suggests that enrollment of Pell students should have increased. Thus, it should be expected that reverting to the requirement that HOPE awards be offset by Pell award would reduce enrollment of Pell students.

Pre-K

Two main changes to Pre-K are to change the funding per student or change the number of slots. Changing the number of slots has a direct relationship with the number of children in the Pre-K program. However, there are no studies that have explored the extent to which the Pre-K program has diverted children from other Pre-K programs, which might be better or worse than the Georgia Pre-K program.

Changing funding per slot will affect the quality of the Pre-K program. There is a common belief that a high quality Pre-K program would be better, i.e., would increase school readiness and performance. Generally, quality is measured by the amount of resources available, not by the outcomes of the program. And, there are wide differences of opinion as to what resources per pupil would be necessary in order to have a high quality Pre-K program. But the relevant question is, how would the outcomes of the Pre-K program change if the available resources increased or decreased? However, we found no research that allows us to answer that question.

Another option for reduced funding is to require means testing for eligibility. This would reduce access to Pre-K for higher income families. To the extent that higher income families are more likely to find a private alternative, the reduction in children enrolled in Pre-K overall is likely to be smaller than what would occur with an across the board reduction in slots. Requiring means testing would likely have

implications for enrollment in other programs that Pre-K providers offer, as well as for associated administrative costs.

Cost of a "High Quality" Pre-K Program

In funding Pre-K there is a trade-off between the number of students served (that is the number of slots funded) and the quality of the program. In making a decision regarding quantity and quality it is helpful to know what the increase in quality would be from an increase in resources.

The literature is not precise in specifying the expenditures per student that are necessary for a high-quality Pre-K program. The estimated cost per student for a high-quality Pre-K program ranges from about $5,300 to over $11,000. These variations represent disagreements across studies as to what a high-quality Pre-K program would look like.

Most of the attempts at quantifying the expenditures necessary for a quality program start by specifying what a high-quality Pre-K program would be in terms of the education of the teachers, the student-teacher ratios, the hours per year for the program, and other resources. In these studies there is no attempt to link the specified resources to program quality as measured by, say, the ECERS-R. There have been several attempts to measure such cost. For example, the Institute for Women's Policy Research (Gault, Mitchell, and Williams 2008) produced an estimate of the required funding for a high-quality Pre-K program. They conclude that for a 6-hour per day, 185 days per year program the cost per student would vary from $5,741 per student to $9,076 per student depending on class size and teacher qualifications.

Revenue Options

The following are possible revenue sources that could be used to supplement the lottery revenue in order to fund an expansion of the number of Pre-K slots or an increase in the funding per slot, or to maintain the HOPE Scholarship and Grant. Note that these are list of options; they are not recommendations.

Options for Supplemental Funds for Pre-K

The most obvious alternative is to use revenue from the general fund beyond lottery revenue. This could done through a general appropriation, built into the QBE formula, or using earmarked revenue, such as the state 0.25 mill property tax, a percentage of sales or income tax, or the tobacco tax. There are some potential difficulties using general fund revenue for Pre-K. First, state law currently prohibits the use of general fund for lottery-funded programs. Second, given the mix of providers of Pre-K, including public schools and private non-profit and for profit agencies, incorporating Pre-K into QBE would have to be done differently than adding another program category to QBE. Third, the Georgia Constitution would have to be amended to allow earmarking.

Another option is to charge tuition, perhaps with a sliding scale. The Temporary Assistance to Needy Families (TANF) block grant and Child Care and Development Fund (CCDF) are potential sources for funding Pre-K, but there are many features of these programs that limit the use of these funds or at least raise concerns about their use to fund Pre-K. Some states have developed the funding for Pre-K programs through public-private partnerships, but such partnerships are not likely to generate sufficient funding to finance a significant expansion of a Pre-K program.

Options for Supplemental Funds for HOPE

There are few options for funding HOPE, particularly if the objective is to keep the size of the award equal to tuition, plus books and fees. As with Pre-K, the most obvious alternative is to use revenue from the general fund to provide supplemental financing for HOPE. The magnitude of the HOPE aid could be reduced, which would mean that students on HOPE would have to pay some tuition.

I. Introduction

Georgia was a pioneer in providing a universal but voluntary Pre-K program for 4-year olds and in establishing the HOPE program, which is a merit-based post-secondary scholarship and grant program for all students enrolled in college or a technical school who meet eligibility requirements. Funded by the Georgia lottery, these programs have served thousands of students since 1994 (HOPE awards total 1.3 million and Pre-K has enrolled over a million students). They have become very popular programs, serving Georgia residents across the income distribution and serving as an amenity for new businesses and families considering moving to Georgia.

HOPE entitles any student who meets the eligibility requirements to a scholarship or grant. For Pre-K, on the other hand, the number of children served in any year is limited by the number of slots that are funded by the state from lottery revenue. The total appropriation to the two programs is essentially limited by lottery revenue, although the State can dip into the lottery reserve fund.

Given HOPE eligibility standards the State needs to appropriate sufficient funds to cover the HOPE scholarships and grants for all eligible students. Thus, to some extent, Pre-K programs are allotted the residual revenues. This is simplistic, as at times the State has changed eligibility standards and reduced expenditures on HOPE Scholarship and Grant programs, in part to allow additional funds to go to Pre-K.

There is little evidence to suggest that the allocation of lottery revenue between Pre-K and HOPE results from decisions driven by consideration of the trade-offs in what the two programs accomplish. Performance-based budgeting would indicate that a desirable allocation of funds between the two programs would consider the objectives of each program (Pre-K and HOPE) and how different allocations of lottery revenue would affect the achievement of these objectives.

The objective of this report is to present information that would better inform that trade-off. Ideally, we would present results that would measure or identify the effects of changing the level of funding for the two programs. However, that is not feasible within the scope of this project. Thus, existing research is used to evaluate the effects of the programs; this allows us to speculate on the effects of shifting

resources from one program to another. The first step is to identify the objectives of the programs since they determine how we would measure the benefits of the programs. We then present existing evidence of the benefits or outcomes of the two programs and discuss how increases or decreases in funding might affect these outcomes.

The report is organized as follows. We start by describing the current programs, which is followed by a brief history of the two programs. In section 4 we discuss the objectives of the programs, followed by a summary discussion of the existing research on the effect of the programs on the identified objectives. We then discuss how the programs might be altered in response to increases or decreases in funding. Next we speculate, based on the existing literature, how such changes in funding would affect the programs' outcomes. Finally, we present estimates from existing studies of the resources required in order to provide a high-quality Pre-K program and what sources of revenue beyond lottery revenue that might be used to fund an expansion of Pre-K and HOPE.

II. Descriptions of HOPE and Pre-K Programs

This section provides background information regarding the HOPE and Pre-K programs.

HOPE

The HOPE (Helping Outstanding Pupils Educationally) program is actually comprised of several programs, the largest of which (in terms of expenditures) are the HOPE Scholarship and HOPE Grant programs. Table 1 provides a brief description of the each of the HOPE programs along with the appropriation for FY 2010 (as amended) and FY 2011. Some of these programs were not funded for FY 2011. We also list several non-HOPE student aid programs since consideration was given during this past General Assembly session to fund some of them with lottery funds.

TABLE 1. SUMMARY OF STATE-FUNDED, POST-SECONDARY AID PROGRAMS

Lottery-Funded Programs	Description	Lottery Allocation (Budgeted) FY 2010, Amended	Lottery Allocation (Budgeted) FY 2011
Accel	Scholarship for public or private high school 9th-12th graders taking courses at public or private colleges and technical colleges. Pays tuition, fees, and book allowance at public post-secondary schools and $166.66 per semester at private post-secondary schools for FY2011. Award amounts follow HOPE Scholarship amounts. Courses must be in areas of core graduation requirements. Credit hours count toward HOPE paid-hours limit. Students are limited to 4 semesters or 6 quarters of payment.	$7,264,625	$5,764,625
Scholarship for Engineering Education	Provides forgivable loans for engineering students at Mercer University. $1750 per semester, for a maximum of $5,250 per year, up to an aggregate maximum of $17,500, or 10 semesters. Graduate must work in an engineering-related field in Georgia. $3,000 is forgiven for each year of employment.	710,000	550,000
Georgia Military College Scholarship	Provides 39 two-year, full-scholarships to attend Georgia Military College. Recipients must have a high school GPA of at least 2.50, and maintain that GPA in college, and a SAT score of at least 800. Recipients must be a member of the Georgia National Guard.	1,228,708	1,228,708

Table 1 continues next page…

TABLE 1 (CONTINUED). SUMMARY OF STATE-FUNDED, POST-SECONDARY AID PROGRAMS

Lottery-Funded Programs	Description	Lottery Allocation (Budgeted) FY 2010, Amended	Lottery Allocation (Budgeted) FY 2011
HOPE GED	Awards a one-time $500 voucher for a student receiving a GED awarded by the Technical College System. Voucher can be used towards tuition, books and other educational expenses at an eligible public technical college or public or private college.	3,003,617	2,573,864
HOPE Grant	Grants to students seeking a diploma or certificate at a public post-secondary institution.	189,767,746	206,318,361
HOPE Scholarship-Private School	Merit scholarship of $3,500 per year (increased to $4,000 per year for FY2011) for students attending an eligible private post-secondary institution	45,182,629	59,332,133
HOPE Scholarship-Public School	Merit scholarship for students attending an eligible public post-secondary institution	439,062,132	474,575,353
Promise Scholarship	Forgivable loans to college juniors and seniors ($3,000 per year) who aspire to be public school teachers in Georgia. Must have a 3.00 GPA at a public or private college that offers a teacher education program. $1,500 is forgiven for each year of teaching.	5,855,278	0
Public Safety Memorial Grants (PSMG)	Grant to children of Georgia law enforcement officers, firefighters, EMTS, correctional officers, and prison guards who were permanently disabled or killed in the line of duty, to attend a public post-secondary institution in Georgia. Merged with LEPD for FY2011	255,850	306,761
Teacher Scholarship	Forgivable loans for individuals seeking advanced education degrees in fields of study with critical shortages. $125 per semester hour at public universities and $200 per semester at private universities. $2,500 is forgiven for each year of teaching. Approximately 1,000 scholarships are given on a first-come, first-served basis.	5,332,698	0

Table 1 continues next page…

TABLE 1 (CONTINUED). SUMMARY OF STATE-FUNDED, POST-SECONDARY AID PROGRAMS

Lottery-Funding Programs	Description	Lottery Allocation (Budgeted) FY 2010, Amended	Lottery Allocation (Budgeted) FY 2011
College Opportunity Grant	NEW PROGRAM: a needs-based grant for attending public post-secondary institution. Must receive PELL grant. Eligibility criteria and the amount of grant to be determined by GSFC.	NA	15,000,000

Non-Lottery Funded Programs	Description	Other State Revenue Allocation FY 2010	Other State Revenue Allocation FY 2011
Guaranteed Educational Loans	Forgivable loans to students enrolled in critical fields of study, such as nursing, physical therapy, and pharmacy	3,189,883	0
HERO Scholarship	Grants to members of the Georgia National Guard and U.S. Military Reservists who served in combat zones and to their spouses and children	660,000	800,000
Law Enforcement Dependents Grant (LEDG)	Grant to children of Georgia law enforcement officers, firefighters, and prison guards who were permanently disabled or killed in the line of duty, to attend an eligible private or public post-secondary institution in Georgia. Merged into the PSMG program for FY2011	50,911	0
LEAP	Provides grants to students who demonstrate substantial financial need. Program is funded by Federal and State funds. Budget numbers reflect State portion of funding only.	930,081	966,757
North Georgia Military Scholarship Grants	Full scholarship to attend North Georgia College and State University. Student must fulfill service obligation, or converts to a loan.	1,302,800	1,352,800
North Georgia ROTC Grants	Grant to attend North Georgia College and State University and participate in ROTC. Student must fulfill service obligation, or converts to a loan.	852,479	802,479
Tuition Equalization Grants	Grant to Georgia residents who attend eligible private post-secondary institutions	28,276,934	28,146,791

As noted above, the HOPE Scholarship and Grant programs are the principal HOPE programs, and thus we provide more detail about these programs, including the eligibility conditions.

General Eligibility Conditions for HOPE Scholarship and Grant Programs

The following are eligibility conditions that apply to both the HOPE Scholarship and HOPE Grant programs. To be eligible a student must satisfy the following requirements:

- The student must be U.S. citizen or eligible non-citizen, for example, permanent resident.
- The student must be a Georgia resident.
- The student must be enrolled in an eligible institution, either full or part time. Eligible institutions are as follows:
  - for the HOPE Scholarship:
    - A unit of the University System of Georgia
    - A unit of the Technical College System of Georgia
    - A private independent non-profit post-secondary institution located in Georgia and accredited by Southern Association of Colleges and Schools
    - A private propriety post-secondary institution located in Georgia, which grants a Baccalaureate Degree, is accredited by a regional accrediting agency, and has been in existence for at least 10 years.
  - for the HOPE Grant:
    - A unit of the University System of Georgia
    - A unit of the Technical College System of Georgia
- The student must not be in default on a Federal Title IV or State of Georgia educational loan, nor owe a refund on a Federal Title IV or State of Georgia student financial aid program, nor in any other way be in violation of Federal Title IV Regulations or State of Georgia student financial aid program regulations.
- The student must maintain Satisfactory Academic Progress, as defined and certified by his or her Eligible Post-Secondary Institution.
- The student must be in compliance with United States Selective Service System requirements, if such requirements are applicable.
- The student must be in compliance with the Georgia Drug-Free Post-Secondary Education Act of 1990 (O.C.G.A. § 20-1-24).

Description of HOPE Scholarship Program

The following describes the details of the HOPE Scholarship program, including award amounts, requirements, and general procedures.

The HOPE Scholarship is a merit-based scholarship program with specific academic and grade point average requirements. The scholarship amounts are as follows:

- For public post-secondary institutions the program pays
  - the full cost of tuition
  - book allowance of $150 per semester for full-time students
  - HOPE-approved mandatory fees (capped at 2003-2004 level).

- For private colleges and universities the program pays
  - $1,750 for full-time enrollment per semester (increased to $2,000 for FY2011)
  - $875 for half-time enrollment per semester (increased to $1,000 for FY2011).

- HOPE Scholarship is reduced by the amount of other awards that are required to be used for tuition and mandatory fees.

The specific eligibility requirements are:

- For a graduate of an eligible high school:
  - A student meeting the college preparatory curriculum track requirements must have a minimum 3.00 cumulative grade point average in courses that could satisfy the core curriculum graduation requirement for that track.
  - A student meeting the career/technology curriculum track requirements must have a minimum 3.20 cumulative grade point average in courses that could satisfy the core curriculum graduation requirement for that track.

- For a graduate of a non-eligible high school or a student who was home schooled through a program not accredited by a HOPE-recognized accrediting agency, or for a student that earned his or her GED:
  - Earns a 3.00 post-secondary cumulative GPA after having accumulated 30 semester hours after high school graduation (award is retroactive), or
  - Earned a score at the 85 percentile or higher on a standardized college admission test.

- Maintain a 3.00 cumulative grade point average. Check points are at every 30 semester credit hours and at the end of each spring term.

- A student who loses (or was not eligible for) HOPE can regain (or gain) it by increasing his or her cumulative GPA to 3.00; HOPE cannot be regained after 90 credit hours.

- Maximum eligible credit hours are 127 semester hours; there is an exception for specific programs that require more than 127 credit hours.

- Courses covered include study abroad courses, courses taken as a transient student, distance learning courses, and learning support courses.

Description of the HOPE Grant Program

The HOPE Grant is a grant program for eligible students seeking a technical certificate or diploma from a Technical College System of Georgia institution or University System of Georgia System institution. (Students enrolled in associate degree programs are treated as college students, i.e., they must have a minimum high school GPA and maintain a 3.00 GPA.)

The grant amount consists of:

- Full cost of tuition
- $150 book allowance per semester for full-time student
- HOPE-approved mandatory fees (capped at 2003-2004 level).

The specific eligibility requirements for the HOPE Grant are:

- Grant is limited to a total of 63 semester hours; some specific programs have a limit of up to 86 semester hours.

- There is no limit on the number of diplomas or certificates earned, only on the number of credit hours.

- Courses covered include courses taken as a transient student, distance learning courses, and learning support courses; study-abroad courses are not eligible.

- There are no minimum high school GPA requirements, but students must maintain satisfactory academic progress, as defined and certified by the Eligible Post-Secondary Institution.

Pre-K

Georgia's Pre-K program is a full day (6.5 hours) of instructional services, five days per week for 36 weeks (180 days), for a total of 1170 hours per year of appropriate educational/instructional services to eligible four-year-old children. To be

eligible for the Pre-K program in 2010-11 a child must be four years of age on September 1, 2010, i.e., whose birth date is between September 2, 2005 and September 1, 2006. Children who are five years of age on September 1, 2010, and have not attended Georgia's Pre-K Program as four year olds, may enroll in the Pre-K program.

The State, i.e., Bright from the Start, the Department of Early Care and Learning (DECAL) has detailed requirements for Pre-K providers, including:

- The curriculum must be chosen from a list of pre-determined curricula or approved by DECAL
- Lead teachers must hold at least a bachelors degree and be certified (PSC or National Board)
- For full funding, class sizes must be 20 children
- Providers must adhere to operating guidelines and undergo an annual evaluation.

The FY 2010 appropriation for the Pre-K program was $350,114,108. This was increased to $355,534,479 for FY 2011. The state provides a grant to the Pre-K provider for each student enrolled, the amount of which is determined according to geographic region and credentials of the instructors. For 2009-10 the total lottery allocation averaged $4,167.00 per child. Funding rates vary between public schools, private schools in metro Atlanta, and private schools outside the Atlanta area, as well as by the qualification of the lead teacher.

Until this year, Resource Coordination grants were also funded; these allowed some Pre-K providers to hire Resource Coordinators who provided assistance in linking families to other modes of assistance, e.g. services for special needs children or health services. These grants totaled over $18 million in 2009-10 but were reduced by $9.25 million in the 2010-11 budget. For FY 2011, the Resource Coordinators were converted to Transition Coaches, with a corresponding change in purpose.

Eligible providers include public schools (including charter schools, technical colleges, and University System schools), both nonprofit and for-profit private schools, and military bases. Almost all public school systems participate (163 out of 180), but private providers actually enroll over half the participating children.

For the 2010-11 school year, 84,000 slots were budgeted. Waiting lists are maintained; any eligible child for whom a spot cannot be obtained may, at the parents' request, be placed on waiting lists at multiple centers. The current, non-duplicative waiting list numbers in excess of 10,000 students.

Some Background Information

This section provides some background information about the size of the two lottery-funded programs. Table 2 shows the growth in the two programs, both in terms of the number of students (or slots) and expenditures. Both programs have grown. The number of available Pre-K slots increased nearly ten-fold between 1994 and 2010, while the number of HOPE awards increased by a factor of 5.8. In terms of expenditures, however, the growth in the HOPE awards far exceeds that of Pre-K. Expenditures on HOPE increased thirty-fold between 1994 and 2010 whereas Pre-K expenditures increased by a factor of 9.2. Funding per Pre-K slot actually declined between 1994 and 2010, from $4,253 to $4,167, so that the increase in expenditures on Pre-K is due to the increase in enrollment. The increase in the dollar amount of HOPE Awards is due to both the increase in the number of awards and to increases in tuition as set by the Board of Regents.

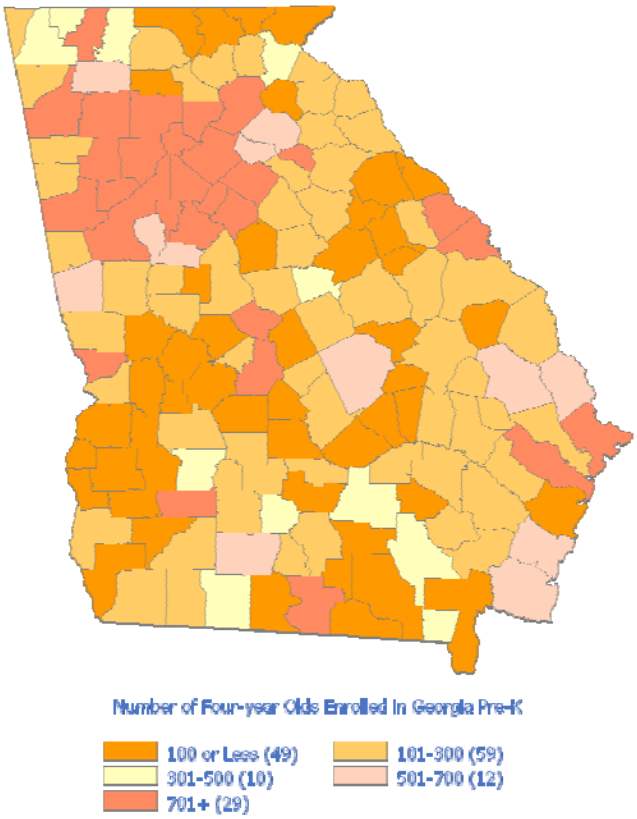
For FY 2009-10 there were 109,869 unique students who received a HOPE Scholarships. There were 88,833 students at University System colleges, 7,372 students at Technical schools, and 14,953 students at private colleges who received awards. In fall 1999, 81.6 percent of freshmen entering Georgia public colleges had a HOPE Scholarship, while in 2009 it was 49.4 percent. There were 138,982 students who received a HOPE Grant award in 2010. In addition, there were 5,689 HOPE GED Grants.

TABLE 2. GROWTH IN PRE-K AND HOPE

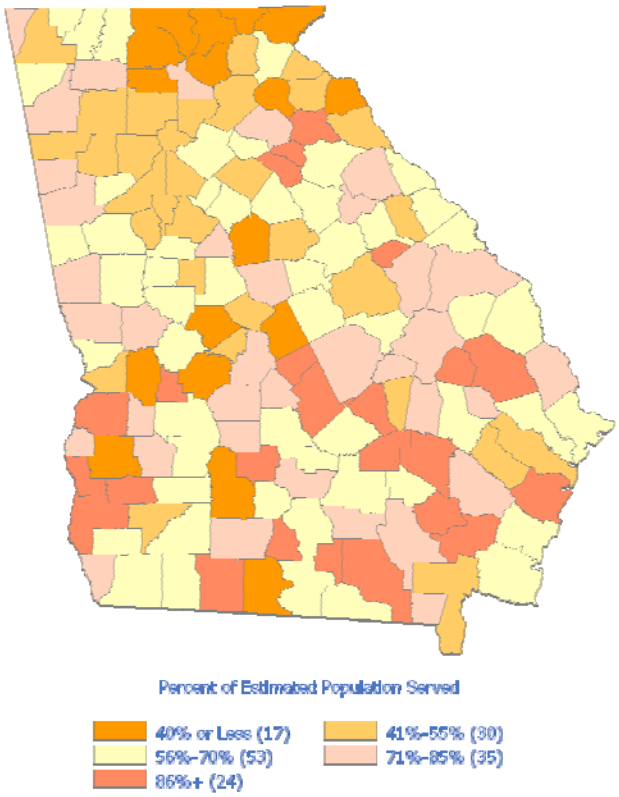
Fiscal Year	Number of Pre-K Slots	Expenditures on Pre-K (in millions)	Number of HOPE Scholarship Recipients	Number of HOPE Grant Recipients	HOPE Scholarship Awards (in millions)	HOPE Grant Awards (in millions)
1994	8,700	$37	24,443	16,971	15.7	4.8
1995	15,500	$78	53,606	43,061	63.5	18.2
1996	44,000	$182	70,377	51,086	105.1	26.3
1997	57,000	$205	70,636	56,056	121.1	29.85
1998	60,000	$210	73,298	62,295	136.9	34.3
1999	61,000	$216	75,127	66,260	150.8	36.5
2000	62,000	$225	78,462	69,128	166.2	40.6
2001	62,500	$229	84,325	84,887	207.5	67.0
2002	63,500	$237	91,649	104,684	233.4	86.9
2003	65,900	$253	99,915	113,317	261.8	97.6
2004	68,200	$260	106,468	116,913	297.2	104.2
2005	72,000	$276	111,645	111,657	323.2	101.5
2006	74,000	$290	104,811	108,319	332.2	101.6
2007	76,600	$309	107,464	100,414	354.2	95.8
2008	78,000	$325	99,422	103,601	352.6	105.1
2009	79,000	$337	102,691	114,288	391.5	128.7
2010	82,000	$342	109,869	138,982	453.1	183.3

In 2009-10, the total number of children in a Pre-K program was 81,068, of which 34,857 were in public school programs, 45,303 were in private programs, and 908 were at other sites, including Technical Colleges and military bases. In 2008-09, the number of Pre-K students was 58.2 percent of the estimated number of four-year-olds. The actual cost per student was $4,212. There were 163 participating school systems (out of the 180 school systems) accounting for 797 individual schools, and 775 private providers. The total number of sites was 1,909.

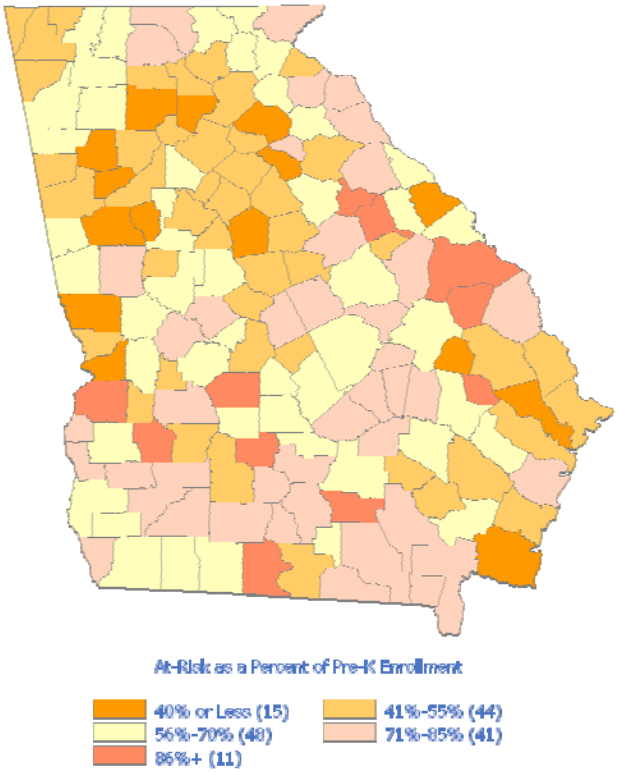
MAP 1. NUMBER OF STUDENTS ENROLLED IN PRE-K IN 2008-09



MAP 2. PERCENT OF ESTIMATED FOUR-YEAR-OLDS IN PRE-K IN 2008-09



MAP 3. PERCENT OF ENROLLED STUDENTS IN 2008-09 WHO ARE AT-RISK



Maps 1, 2, and 3 illustrate the distribution in Pre-K across Georgia counties. Map 1 shows the number of Pre-K slots by county. The range is from 12 to 7,500 slots per county, with a median of 180 slots. It is not surprising that larger counties, such as those in urban areas, have more slots. Of more interest is Map 2, which shows the percentage of four-year-olds enrolled in a Pre-K program. The range is from 20 percent to 125 percent, with a median of 66 percent. There are two reasons why the percent might be more than 100 percent. First, the number of 4-year-olds is estimated, and there may be errors in the estimates. Second, students who are enrolled in a Pre-K program in one county may live in another county.

Map 3 shows the percentage of Pre-K students who are classified as at-risk. Bright from the Start defines an at-risk student as one in which the child or its family participates in at least one of the following programs: Food Stamps, SSI, Medicaid, TANF, Child and Parent Services, or PeachCare for Kids. The range is from 20 percent to 100 percent, with a median of 60 percent. We do not know the percentage

of at-risk children who are enrolled in a Pre-K program because there is no estimate of the number of at-risk children in the state.

The Department of Early Care and Learning (DECAL) reports the following recent accountability results:

- 99 percent of Pre-K providers meet requirements in terms of lead teachers having the necessary certifications and degrees.

- 99 percent of Pre-K providers meet the required staff/child ratio.

- In a recent study released by DECAL from the Frank Porter Graham Center at University of North Carolina at Chapel Hill, Georgia Pre-K programs earned an overall ECERS-R rating of 4.16 for classes based in centers and 3.74 for classes based in public schools; these ratings indicate that the overall quality is "medium." The CLASS results indicate that Pre-K classrooms generally rate high on the quality of emotional support and classroom organization but low on instructional support. Note that these results are consistent with findings for Pre-K classrooms in other states.[1]

[1] The FPG Child Development Institute study (Maxwell et al. 2009) states that only 13 percent of a sample of 1,500 Pre-K classrooms in eleven states scored at least 3.25 on Instructional Quality; in Georgia, 11 percent of Pre-K classrooms scored 3.25 or higher in that dimension.

III. History of HOPE and Pre-K Programs

The Constitutional Amendment authorizing the Georgia Lottery and the associated legislation was passed by the General Assembly in 1992. The Constitutional Amendment was approved by the voters in November 1992. In this section we provide a brief history of the changes that have been made to HOPE and Pre-K since their inception.

HOPE

The first HOPE Scholarship was awarded in September 1993; FY 1994 was the first year of lottery-funded programs. The initial HOPE Scholarship paid only tuition, net of any Pell award (students were required to apply for Pell), for only two years. Eligibility was restricted to high school graduates in 1993 or later who graduated with at least a B average and came from families with income of $66,000 or less. There was no income cap for students attending private colleges. Eligible students attending private schools were given $500 Scholarships for each of the first two years of college. HOPE Grants were restricted to two credentials.

Many changes to the program have been made since 1993. The significant changes include the following:[2]

FY 1995

- HOPE Scholarship for private colleges was increased to $1,000.
- HOPE Scholarship was expanded to cover 4 years of college.
- A book award of $100 per quarter or $150 per semester was added.
- Payment for mandatory fees was added.
- The income cap was increased to $100,000 for students attending public colleges.

[2] The list is taken from the Georgia Student Finance Commission's website and a presentation made to the Georgia General Assembly Joint Higher Education Committee on August 2, 2010.

FY 1996

- Students who lost the HOPE Scholarship after the freshman year were given the option of regaining HOPE if they increased their overall GPA to 3.0 at the end of their second year.

- Nontraditional students, i.e., those who graduated before 1993, can qualify for HOPE after their sophomore year.

- HOPE Scholarship for private colleges was increased to $1,500.

- The income cap was completely removed.

FY 1997

- A requirement that private college students had to maintain a 3.0 GPA was added, beginning with the class graduating from high school in 1996. The original non-merit-based HOPE Scholarship for private college students continues at $1,500 for sophomores (for the last year FY 1999), juniors (last year FY 1998) and seniors (FY 1997 only) until it phases out and is replaced by the merit-based scholarship after FY 1999.

- Private school Scholarship for high school graduates beginning 1996 and later (FY 1997) is increased to $3,000.

FY 1998

- Nontraditional students who graduated before 1993 can qualify for HOPE after their freshmen or sophomore year (at public and private colleges).

FY 1999

- Home schooled students allowed to receive a HOPE Scholarship if they earned a 3.0 GPA at the end of their first year in college (30 credit hours). Payment is retroactive.

- Constitutional Amendment is passed specifying what programs the Georgia Lottery funds can be used for passes in November.

FY 2000

- Courses that count toward the high school GPA for HOPE were restricted to core courses.

- Pell Offset was removed as part of the A+Education Reform Act.

- Limitations on use of the HOPE Grant are removed.

FY 2003

- Home-schooled students recognized by the Accrediting Commission for Independent Study are eligible as freshmen.
- "Improvement of the HOPE Scholarship Joint Study Commission" created by SR 220.

FY 2004

- Recommendations from the "Improvement of the HOPE Scholarship Joint Study Commission" form the basis of legislation in both the House and Senate – language from both was incorporated into HB 1325.
- "Triggers" are passed to cause future benefit reductions in the event of declining reserve fund (HB 1325).
- A cap of 95 quarter hours taken under the HOPE Grant and 127 semester hours (or the equivalent) combined HOPE Scholarship and Grant hours is imposed (HB 1325).
- Payment for mandatory fee is capped at January 2004 levels (HB 1325).
- New GPA calculation, applicable to the graduating class of 2007, becomes law (HB 1325).
- Accel program is added.

FY 2005

- Spring checkpoint eligibility after spring term 2005 imposed.
- Accel program begins operation.

FY 2007

- HOPE high school GPA calculated from transcript data by Georgia Student Finance Commission (GSFC) begins for the graduating class of 2007.

FY 2010

- HOPE Scholarship for private college students increased to $3,500.
- Home study students, ineligible high school graduates, and GED recipients can earn HOPE by scoring at least at the 85 percentile on the SAT or ACT.

FY 2011

- HOPE Scholarship for private college students increased to $4,000.

Pre-K

1992

- Pre-K began as a pilot program serving 750 at-risk four-year-olds.

1993

- Pre-K program financed by lottery funds is established and served 9,000 at-risk children in its first year.

1995

- Pre-K was opened as a voluntary program to all four-year-old children for FY 1996.

- Program size tripled, from 15,500 slots in 1994-95 to 44,000 slots in 1995-96.

1996

- The Pre-K program is moved from the Department of Education to the Office of School Readiness which was created by Georgia General Assembly.

2002

- Tenth anniversary of Pre-K, at this point over 500,000 children had participated.

2004

- As a result of legislation the Office of School Readiness was replaced by Bright from the Start: Georgia Department of Early Care and Learning with a 13-member Board of Commissioners that is appointed by the Governor. DECAL's responsibilities were expanded beyond administration of Georgia Pre-K to include child care licensing and standards and administration of food programs, areas previously under the jurisdiction of the Department of Human Resources.

2008

- Over 78,000 four year olds enrolled in Pre-K.

2010

- One millionth child served in Georgia Pre-K.

2011

- 84,000 slots budgeted for Pre-K.

IV. Program Objectives

In this section we discuss the program objectives. There are many objectives that have been attributed to the programs, by Governor Miller and others. We start with a discussion of what appeared to be the intent when the programs were first proposed. We then provide a specific list of objectives.

Legislative Intent

In this section we discuss the original objectives for Pre-K and HOPE. We first sought to determine what the elected officials intended when they adopted the Constitutional Amendment authorizing the lottery and the general law specifying what the lottery funds would be used for. However, Georgia does not record sessions of the General Assembly, nor does it normally publish statements of intent or purpose. Thus, to understand the intended purpose we reviewed speeches and writings by Governor Miller and talked to staff of Governor Miller. (Sarah Eby-Ebersole (1999) provides a more extensive discussion of the motivation and development of the Pre-K and HOPE programs.)

During his 1991 campaign for Governor, education was a very important issue for Zell Miller. According to Steve Wrigley, who was Governor Miller's chief of staff, Miller's concern was that education, particularly high quality education, was not as important to Georgia residents as he thought is should be.[3] There was a perceived lack of appreciation for education in Georgia, particularly high quality education, and Miller wanted to find ways to elevate the importance of education to the citizenry. So, his initial primary intent was not related to the specific programs, but was more general, namely to change attitudes towards the importance of high quality education.

Miller stated in his campaign platform that "the schooling that most of our children are getting is not adequate for the increasingly technical world in which they must compete."[4] He noted that almost 40 percent of Georgia's students fail to earn a

[3] Interview with Steve Wrigley on June 2, 2010.
[4] "The Georgia That Can Be: A Blueprint for the 1990s," The Zell Miller for Governor Campaign. Undated. P 4.

high school diploma and that three out of five college freshmen require remedial work.

During his campaign, Miller proposed a state lottery, with the net proceeds to be used for education. He did not want the lottery proceeds to replace general funds allocated to education, but rather used for "new and creative programs, such as a comprehensive drug education program in every school, bonuses to assist in alleviating certain teacher shortages, leadership training, after school programs for latch-key kids, summer enrichment programs, and a voluntary pre-kindergarten program. The last two are especially important for reaching at-risk students and challenging gifted students."[5] No mention was made in the campaign of a college scholarship program.

After being elected Governor, Miller pushed the lottery and proposed that the net proceeds be used for a voluntary pre-kindergarten program, a scholarship program for post-secondary education (HOPE), and grants for technology improvements.

In his 1992 State of the State address, Miller (1998) put his education plans front and center. He noted that the Carnegie Foundation for the Advancement of Teaching had found that 40 percent of Georgia's kindergarten students were struggling (see Boyer 1991). He cited research findings that "at-risk children who attend preschool are more likely to complete high school, more likely to find stable employment, more likely to continue their education, less likely to become pregnant as teens, less likely to be on welfare, and less likely to be arrested." (p. 57)

Miller proposed a voluntary Pre-K program that would be targeted at the estimated 40 percent of four-year-olds in Georgia who were at risk, essentially children from low-income families. His second program was funding for equipment and special capital needs.

The third program he called for was a scholarship program for bright students who otherwise would find it difficult to go to college. He noted the low percentage of Georgia children who graduate from college and the need for a better-educated workforce.

[5] "The Georgia That Can Be: A Blueprint for the 1990s," The Zell Miller for Governor Campaign. Undated. P 5.

When Miller unveiled the details of the proposed tuition plan on September 23, 1992, it received mixed reviews. For example, the *Atlanta Journal-Constitution's* headline on September 24, 1992 was "Tuition Plan Controversial from the Start."

Initially the Pre-K program was aimed at improving the performance of at-risk students. While the short-term objective was to ensure that children entering kindergarten are prepared to learn, the expectation was that it would also improve such things as high school dropout rate, post-secondary education, and social behaviors. While Governor Miller initially spoke of the importance of reaching at-risk children, and the initial Pre-K program was limited to at-risk children, limiting the program to just at-risk children was in part driven by the initial revenue estimate for the lottery, which was well below the actual proceeds. When lottery revenue substantially exceeded projections and opposition to a program that would take 4-year olds out of the house did not appear as strong as had been expected, the program was quickly expanded to allow any four-year old to attend.

Initially, the HOPE program was aimed at middle- and low-income households (and originally covered only the first two years of college) because of the revenue estimate; an income cap was in place for the first two years. But when the lottery revenue far exceeded expectation, the income cap was removed.

According to Steve Wrigley, Miller wanted to increase the number of students going to college without concern about affordability. But he wanted to increase access to all post-secondary education. He had in mind the GI Bill, where in response to serving one's country you could get a college education. With HOPE you get a college education as a reward for working hard in school and getting a B. The following is from a recent report on HOPE (Carl Vinson Institute of Government no date),

> "In 1990, Zell Miller was elected Georgia's 79th governor. Miller, who came from a low-income family, was able to attend the University of Georgia only because of the benefits afforded by the GI Bill. He proposed the Helping Outstanding Pupils Educationally (HOPE) Scholarship program to enable Georgians to further their education the way he had done as a youth. According to Miller, the philosophical basis of HOPE, a broad-based merit scholarship, is just like that of the GI Bill. "You give something, you get something—that's the premise of HOPE," he said. What entering college students must "give" is achievement in the form of a "B" average in their high school studies. What they get is free tuition as long as they maintain that

> "B" average. HOPE also provides free tuition to students who choose to pursue a technical diploma or certificate." (p. 1)

Miller was also concerned that students who didn't want to go to college would be able to get more education, either vocational training or a GED. Wrigley stated that the likely performance metric for Miller would have been the increase in the percentage of students going on to post-secondary education.

The objectives that Governor Miller had for HOPE can be found in various sources. *The New Georgia Encyclopedia* lists three objectives that Miller had for the HOPE program:[6]

- "provide an incentive for students to perform better in high school and maintain that performance in college.
- encourage top-performing high school students to attend college in-state.
- address the disparities between college enrollment of whites and African Americans, and between socioeconomic classes."

In a press release in 1994, Miller stated that, "HOPE is not just a reward for hard work, it is an incentive to work hard."[7] In an editorial in the Atlanta Journal-Constitution, Miller (1992) wrote, "The lottery will directly help families who are struggling with the high cost of tuition." In his 1992 State of the State address, Miller (1996) said, "And just when it is essential to increase the number of youngsters who go into college or technical training, the cost of tuition is soaring out of reach for most of our citizens."

Objectives for HOPE and Pre-K

The previous section identified several objectives for HOPE and Pre-K. Refinements of these objectives and other objectives have been identified by various authors. We initially identified an inventory of possible objectives. Through meetings with the Advisory Committee established for this project and conversations with others we identified a narrower set of objectives that we list below. For each objective we also suggest how those objectives might be measured. We also discuss

[6] *The New Georgia Encyclopedia* http://www.georgiaencyclopedia.org/nge/Article.jsp?id=h-1483&hl=y.

[7] Miller Press Release "Expand HOPE" Nov 22, 1994.

alternative objectives that have been suggested, but which do not seem to be widely accepted.

HOPE

The objectives for the HOPE Grant program are similar to those for the HOPE Scholarship program. And, thus we discuss the objectives for both programs.

1. Increase student achievement in high school and college.

Governor Miller's motivation for establishing HOPE was to increase the importance of education, particularly high quality education, among Georgia residents. But the objective was to motivate students to do better by promoting and rewarding academic excellence. This was particularly true for high school students, but also for college students, since to get and retain a HOPE Scholarship a student must achieve a B average in both high school and college. This objective is somewhat less relevant for the HOPE Grant program since there are no minimum high school performance standards required to earn a HOPE Grant.

There are many dimensions to this objective that might reflect how well HOPE is achieving this objective. In particular, increased student achievement might be reflected in any of the following:

- Improved performance in high school as measured by GPA.
- Increased number of academic and Advanced Placement courses taken.
- Reduced high school dropout rate.
- Increased college retention rate.
- Increase college completion rate.

2. Increase the percentage of Georgia high school graduates who go on to college.

It was also clear that increasing the post-secondary participation rate was and is an important objective of HOPE. This objective would be measured by the increase in the percentage of high school students who attend college. To the extent

that closing the racial gap in the college enrollment rate is an objective, we should consider the differential effect by rate on post-secondary participation rates.

Why increasing the college attendance and graduation is an objective was not discussed. But, the literature identifies many potential benefits of increased education, including increased earnings, better health, less need for social services, and increased participation in public affairs (Wolfe and Haveman 2002).

It has been suggested that the objective should be to increase the college participation rate among students from low-income households. Although the initial HOPE Scholarship program had an income cap due to budget concerns, the cap was quickly removed when lottery revenue far exceeded expectations.

To impose an income cap would convert the Scholarship program into a need-based student aid program. Such a program could be desirable and would limit the cost of the Scholarship program; but it does not appear that either the original or current objectives focus only on increasing college participation rates among students from lower-income families.

It has been suggested that because HOPE is not need-based and because students from lower-income families are less likely to go to college and to have the GPA to be eligible for HOPE, the HOPE Scholarship is essentially a middle-class entitlement. The data might bear this out, but providing a middle-class entitlement was not and is not an objective of HOPE.

3. Increase the quality of Georgia's workforce.

This objective speaks more directly to the HOPE Grant, but it is also relevant to the HOPE Scholarship. In part, this objective would be reflected in the increase in the number of college graduates in the work force and a reasonable measure would be the increase in the percentage of Georgia high school graduates who obtain college degrees and work in Georgia. A narrower measure would be changes in the percentage of students who graduate from Georgia colleges who stay and work in Georgia. For the HOPE Grant, the objective would be reflected in an increase in wage rates among non-college educated workers. In addition, one purpose of increased quality of the workforce is to attract new industry to Georgia. But, economic development was not an objective that was explicitly expressed by Governor Miller.

4. Increase the percentage of the "best and brightest" students who stay in Georgia to go to college.

It is not clear whether Governor Miller originally saw this as an objective, and is clearly not a relevant objective for the HOPE Grant program. However, it has been subsequently touted by Governor Miller and others as a benefit of HOPE. Other states that have adopted HOPE-like programs, list this as one of the objectives. To the extent such students are more likely to work in Georgia after graduation because they went to college in Georgia, it does increase the quality of the labor force. We found no definition of "best and brightest," i.e., there is nothing to determine which students should be so labeled, although the research considers HOPE eligible students as the best and brightest.

Pre-K

1. Increase accessibility to quality early learning for Georgia's four-year-olds.

Governor Miller clearly saw that increasing access to a quality Pre-K program as an objective. Although the Georgia Pre-K program is a voluntary program, many educators, policy-makers, and parents believe, and research supports, that early exposure to an enriched academic environment will benefit most children. There also seems to be some belief that the Pre-K classroom and curriculum will be a better environment for four-year-olds than many child care centers. No clear measures of accessibility are available; the most obvious measure would be to compare the number of four-year-olds in the population and the number of available slots, but this is problematic for several reasons. First, because the program is voluntary, we would need to know numbers for families who wish to put their child in Pre-K classrooms and these data do not exist. Second, parents who cannot find a spot for their child in a desirable Pre-K classroom can put their names on a waiting list, but they can also waitlist their child in multiple centers. DECAL does maintain an unduplicated waiting list, which provides some measure of the number of non-served children. However, even such a list may not accurately measure the number of children who are not served. For example, if the waiting list is long, parents may not apply. Or, some parents may be only interested in a particular site and thus will not be served if slots are increased at another location. If there is an area of the state that does not

have a site that is convenient to a parent, the parent might not apply. The National Institute for Early Education ranks the states for Pre-K access; this listing simply measures the percent of four-year-olds enrolled in a Pre-K program. As stated above, this measure does not truly measure access.

Participation in the Pre-K program will have benefits beyond those associated directly with the classroom. For example, it may help families learn to navigate the K-12 system, it may help to get parents more involved in their child's schooling, it would allow the parents to become connected with and benefit from the Transition Coaches. The previously funded Resource Coordinators might have resulted in more eligible families enrolled in PeachCare and other social services. In addition, the Pre-K program provides quality child care for working parents.

2. Increase accessibility to quality early learning for Georgia's at-risk four-year-olds.

It does appear that increasing access to Pre-K for at-risk four-year olds is an objective separate from the more general objective of increasing access for all four-year olds. It was the focus of Governor Miller, as noted above, and Pre-K was initially restricted to at-risk students. Much of the discussion of the previous goal applies here as well, although perhaps the belief that at risk four-year-olds would benefit from an enriched environment with some academic content is even stronger. The same difficulties in measuring access in general apply here, but are complicated further by the fact that there are no estimates of the at-risk four-year-old population.

3. Improve school readiness by improving cognitive, social, and interpersonal skills.

This objective speaks to the need for young children to have some 'classroom readiness' when they begin kindergarten. Being able to follow instructions, listen to a teacher, and interact with their peers are good skills that will facilitate learning. A reasonable measure for this objective can be found in the Classroom Assessment Scoring System (CLASS). This measure incorporates ten different dimensions of the classroom and teacher-student interactions. For example the Emotional Support Domain measures whether the classroom is a nurturing environment for children. The Classroom Organization Domain examines the teachers' interactions with

children. These elements of the CLASS could be used to assess whether this objective is being met. The Georgia Study on Early Childhood and Education (Maxwell 2009) found that Georgia Pre-K classrooms score high in both these domains, but lower in the Instructional Support domain.

4. Increase academic success in first, second, and third grades, in reading and in math.

This objective is clear; Georgia elementary school children score below national averages in reading and math. Many hope that early education will help to boost children's academic performances in the elementary years. Reading and math ability are measured with a variety of testing instruments. The ELLCO (Language and Literacy Environmental Scale) is used for young children and there are a number of other achievement tests that are routinely used to assess academic learning, so this objective is seemingly easy to measure, given longitudinal data on students and the ability to track students over time.

Participation in a Pre-K program will have benefits beyond those associated directly with academic performance. Additional benefits from increasing academic success include reducing retention and the number of students who need to be enrolled in special needs programs. If giving students a jumpstart on reading and number literacy in Pre-K leads to better performance on reading and math assessments in the early grades, then fewer students will need to be retained to repeat these grades. A similar result is expected for students' enrollment in special needs programs; earlier detection of special needs can result in lower enrollment in these special services later on. Fewer students retained and enrolled in special needs programs is not only desirable for the child and parent, but also reduces the cost of education.

5. Increase long-term social and academic performance.

This objective speaks to the long-run benefits of Pre-K. Some research provides evidence that the beneficial effects of a high quality Pre-K program persist and lead to improved academic performance in later years. Long-term performance could be measured in a number of ways, including higher achievement on assessment exams in middle school and high school. Higher attendance levels in high school,

higher graduation rates, and higher levels of college enrollment are all possible measures of the objective of increasing long-term academic performance. Note also that long-run benefits of Pre-K can be compared to the long-run benefits of HOPE grants and scholarships, discussed above in Objective 3, for HOPE. There are also benefits to the state of having a more educated work force.

The research on the issue of long-term effects will be discussed below, but note that few data sets exist that allow researchers to assess long-term effects of Pre-K. Furthermore, some of the existing studies are based on model programs that included many dimensions of social net-working and care beyond Pre-K programs. It would not be reasonable to generalize results from those studies to Georgia four-year-olds.

V. Evidence on the Effects of HOPE and Pre-K

HOPE

In this section we provide a summary of the existing empirical evidence on the effect of HOPE, or HOPE-like programs in other states, on measures of the objectives of HOPE, as discussed above. We focus on studies that considered HOPE specifically, but we also consider related studies.

Determining the effect of financial aid on student behavior or college enrollment requires separating the effect of student aid from other observed and unobserved factors that affect the behavior under investigation. For example, the responsiveness to student financial aid is likely to vary with the background of the parents; in particular students from low-income families may be more responsive to student aid. This could be because students from poorer households receive less money from their parents, so that a given amount of student financial aid has a larger effect on behavior. These factors must be controlled for in measuring the effect of student aid.

The possibility that unobserved factors might be related to the HOPE program makes it even more difficult to construct evidence of the causal effects of HOPE. These empirical issues requires that the investigator use empirical techniques that account for the effect of observed and unobserved factors that might affect student behavior. (Dynarski (2002) presents a more formal discussion of this issue.) There are two general approaches to these issues that are used in the studies we discuss here.

One approach is to compare the behavior of students pre- and post-HOPE. This approach will work only if there are no changes in other factors that explain changes in behavior. For example, consider college enrollment rates, and suppose that enrollment increased after HOPE was implemented. It might be that enrollment rate was increasing prior to HOPE for various unknown reasons. It is also possible that there were changes in economic conditions or in the potential population of students that could have affected the enrollment rate. In this case one cannot attribute the increase in enrollment to HOPE.

The other approach is to compare pre- and post-HOPE changes in the behavior of Georgia students to changes in behavior of a control group, for example students in other states. This approach is appropriate if the change in behavior (for example, an increase in enrollment) in the other states reflect what would have happened in Georgia in the absence of HOPE. In other words, one has to assume that there were no changes in conditions or policies in the other states that didn't occur in Georgia. The research we discuss generally uses one of these two statistical techniques to measure the effect of HOPE on behavior. We note concerns with the application of the technique where appropriate.

1. Effect on student achievement in high school and college.

HOPE provides various incentives regarding academic performance. Since HOPE holds out the promise of a full scholarship if the student earns and maintains a B average, HOPE should encourage increased academic performance. Thus, we might expect an increase in GPA due to HOPE, particularly among students who would otherwise be somewhat below a B average. HOPE might affect course-taking behavior, both in high school and college. In order to earn or retain a B average, a student might be more inclined to take easier courses, withdraw more quickly from courses in which they are not doing well, and find courses and faculty with easier grading standards. Since only core courses in high school are now used to calculate GPA, we would expect to see an increase in students taking these courses once the requirement changed. Since HOPE makes college more affordable, HOPE might encourage high school students to graduate, particularly among students who would have been unable to afford college without HOPE. To the extent that HOPE positively changed attitudes toward education, we would expect students to take more academically rigorous courses, as well as generally do better in school.

There is one dissertation and two published papers that explore the effect of HOPE on high school performance. The studies generally find evidence that supports the hypothesis that HOPE has led to higher grades in high school, but no evidence of increases in enrollment in more academic courses. We found no studies that looked at the effect of HOPE on other measures of high school performance, such as completion rates or time spent on school work.

Turner (2003) makes use of the change in the nature of the high school courses used to calculate GPA in order to study the impact of HOPE on high school achievement and course-taking patterns. She found that the average high school GPA increased from 85.4291 to 85.9293, a statistically significant, but small difference. While students did take more advanced academic electives in the post-change period, the differences were not statistically significant.

There are many limitations of this study. It considered only three high schools and there were other changes that could have affected course taking, including changes in admission policies in University System schools and the reduction of high school diploma options from 3 to 2. Furthermore, Turner cannot rule out that the increase in GPA is due to grade inflation rather than more effort.

Henry and Rubenstein (2002) consider the effect of HOPE on high school GPA, as measured by the percentage of students with at least a 3.0 GPA, and on SAT scores. Their approach is to compare high school graduates who enroll in a public Georgia college pre- and post-HOPE. They find evidence that HOPE has increased GPA, independent of any grade inflation. Among males, the percentage eligible for HOPE increased from 43.6 percent to 51.1 percent, while for females it increased from 64.6 percent to 66.9 percent. Furthermore, they find that the percentage of black students with a 3.0 or better GPA increased from 24.4 percent pre-HOPE to 36.9 percent post-HOPE. This 51 percent increase was greater than the 33 percent increase for whites. They also point out that average GPA among Georgia students increased relative to the mean GPA in other states. They also find that the average SAT score increased, and increased relative to other states. However, other research suggests that HOPE resulted in an increase in better students attending Georgia public colleges rather than out-of-state schools. Thus, the measured change in GPA or SAT could be due to a change in the composition of the sample as a result of HOPE, and not to increased academic effort.

Cornwell, Lee, and Mustard (2005) compare SAT scores pre- and post-HOPE for in-state and out-of-state students at the University of Georgia. They find that HOPE resulted in no noticeable relative change in SATM scores, but there was a small relative increase in in-state student scores on SATV. They find that HOPE resulted in an increase in high school GPA of 0.065 points but find no effect of

HOPE on the number of Advanced Placement credits of incoming students. This study is subject to the same concern as the Henry and Rubenstein study, namely that HOPE changed the composition of in-state and out-of-state students, and thus the effect on SAT scores and GPA could be due to this and not to increased academic effort.

Heller and Rogers (2003) provide some simple pre- and post-comparisons of the effect of Michigan Merit Award Scholarships, and find some evidence that the Scholarship increased high school performance. The percentage of students who qualified for the program, which is determined by the student's score on the Michigan Educational Assessment Program, was 47 percent in 2000, the year before the program was instituted. This increased to 54 percent in 2001, and was essentially unchanged in 2002. They find no difference in average ACT and SAT scores over the period, although there was a small decrease in average score for the nation. However, the study does not control for changes in the number or composition of students who took the Michigan Educational Assessment exams or who took the ACT and SAT exams. The time period, 1 year of pre- and 2 years of post-observations, is a very short observation period.

There are three studies of the effect of HOPE on academic performance in college. These studies find some improvement in college performance, but also strategic course-taking behavior that appears to be aimed at maintaining HOPE eligibility rather than improving academic performance.

Cornwell, Lee, and Mustard (2006) examine HOPE's influences on grades in college, course selection, and choice of major among undergraduates at the University of Georgia. They use non-Georgia resident freshmen as the control group. Their estimates indicate that the GPA's of resident freshmen rose almost 0.13 points (or 5 percent) because of HOPE. The authors also find that HOPE reduced by about 1.2 the number of credit hours in math and science core curriculum courses completed by residents. They find that after HOPE was introduced the probability of majoring in education jumped 1.2 percentage points for residents relative to their out-of-state counterparts, which they take to be a shift to an easier major.

Cornwell, Lee and Mustard (2005) use the same sample of UGA students to examine how HOPE has affected course-taking behavior. They find that HOPE

reduced the probability of taking a full course load by 4.2 percentage points (a 5.1 percent decrease) and increased the probability of course withdrawal by 4.2 percentage points (a 16.1 percent increase). They estimate that HOPE reduced the average credit hours taken by one, with decreased course enrollment and increased course withdrawal each accounting for half of that effect. They also found that students increased the probability of enrollment in summer school, for which grading standards are lower, by 7.1 percentage points as a result of HOPE, increased summer school credit hours by 1.44 in the first summer and 1.04 in the second summer. These results support the hypothesis that UGA students engaged in strategic behavior in an attempt to maintain their HOPE eligibility.

Their results do imply that in-state students responded to the incentives created by the criteria for retaining HOPE. But, this does not necessarily imply that the behavioral reaction is evidence of reduced academic effort. Dropping a course, and then repeating it, could result in the student learning more in the second attempt. Taking fewer courses could result in more time being spent on each course being taken.

One concern with this empirical strategy in Cornwell, Lee and Mustard (2005; 2006) is that HOPE could have resulted in a substitution of in-state for out-of-state students, with an increase in the enrollment of better out-of-state students, which is the control sample. A second concern is that they only consider students at UGA. These students are not representative of all students in University System schools, and thus the results cannot be generalized to all HOPE Scholarship recipients.

Henry, Rubenstein, and Bugler (2004a) consider the effect of HOPE on four college performance outcomes: credit hours, grade point average, persistence (defined as a student who was enrolled in fall semester 1999 but has not graduated), and graduation (within four years). They use a sample of college freshmen who graduated from Georgia high school in 1995 and entered college that fall. They select students who were "borderline HOPE Scholars" and matched those students to a set of students who were similar, as measured by GPA, but did not receive a HOPE Scholarship. A concern with this empirical strategy is that students who entered without a HOPE Scholarship could earn a Scholarship if he or she had a B average

after 30 hours. So, the effect that is measured is the result of getting a HOPE Scholarship, and not the HOPE program.

They find that HOPE scholars had 14 more credit hours after 4 years than the control group. This conflicts with the results of Cornwell, Lee and Mustard (2005); the difference could be due to the difference in samples, i.e., UGA students versus students from all University System of Georgia schools, and in the control group, i.e., all other UGA students versus students on the borderline of receiving HOPE. Henry, Rubenstein, and Bugler also found that HOPE scholars had a slightly higher GPA after 4 years of approximately 0.17 points. They also found that HOPE recipients in 2-year schools were twice as likely to have graduated after 4 years as were students in the control sample, while the likelihood of HOPE recipients graduating from a 4-year school after 4 years was 72 percent higher. For non-graduates, HOPE recipients at 4-year schools were 13 percent more likely to be enrolled in the fall of 1999. There was no difference for students in 2-year schools.

In addition to considering HOPE recipients relative to similar non-HOPE recipients, Henry, Rubenstein, and Bugler also compared those HOPE recipients who lose their scholarship to the non-HOPE recipient control group. But since such a large percentage of HOPE Scholars lost their scholarship (85 percent after the 30 credit hour checkpoint), there is not a lot of difference in the sample for this analysis and the original sample of HOPE recipients. Thus the results are not much different, although the effects are a bit smaller. It thus appears that students who got but then lost HOPE made greater progress in college than similar students who did not get HOPE.

We identified one study that considered the effect of HOPE Grants on academic progress in Georgia's technical schools. Resch and Hall (2002) compare students that first enrolled in a Georgia Technical College in fall quarter 1992 (i.e., before the HOPE program) to students who first enrolled in fall quarter 1997 (i.e., after the introduction of HOPE). (Attrition is defined as students who quit attending school prior to completing graduation requirements. Completion is defined as completing at least 50 percent of a program of study and then gaining employment in the field of study.) They find that the percentage of leavers increased from 27.5 percent in 1992 to 30.6 percent in 1997, the percentage of completers increased from

17.8 percent in 1992 to 18.3 percent in 1997, and the percentage of graduates fell from 54.7 percent in 1992 to 51 percent in 1997.

There are several concerns with the analysis of Resch and Hall. Perhaps most important, the adoption of HOPE grant may have caused an increase in enrollment and a change in the composition of the student body. A second issue is that the economy was substantially different in the two years; the economy in 1997 was much stronger than in 1992. Third, there was a substantial number of students dropped from the analysis because their exit status was not available. This could substantially bias the results. These problems cast serious doubts on their results.

We found one article that investigated the effect of student aid on college academic performance resulting from a merit scholarship program in another state. Binder, Ganderton and Hutchens (2002), explores the enrollment, academic, and retention effects of New Mexico's merit scholarship program. The New Mexico Success program's eligibility requires that students maintain a 2.5 GPA and enroll continuously and full-time. They compare student characteristics of those who were eligible for a Success scholarship to a control group comprised of students who were not eligible for a scholarship because they graduated from high school before the program began. They found that first-semester GPA increased as a result of the student aid program, but the number of credit hours completed went down, consistent with the findings of Cornwell, Lee and Mustard (2005).

In summary, there are few studies on the effect of HOPE on academic performance, and most of those studies suffer from methodological limitations. There is weak evidence that the HOPE program increased average high school GPA and that this was not due to grade inflation. There is no evidence of the effect of HOPE on other high school academic performance measures. There appears to be some positive effect of HOPE on college academic performance among all colleges. There is evidence that students take HOPE retention into consideration when making decisions regarding majors and courses taken.

2. Effects on the percentage of high school graduates who go on to college.

Student aid reduces the price of attending college. Standard economic analysis would predict that such a price reduction should increase the likelihood that

someone would enroll in post-secondary education. There are several studies of the effect of student aid on the college enrollment rate. We review both the HOPE-specific studies as well as some of the non-HOPE studies.

We were unable to identify any empirical research that specifically addressed the effect of the HOPE Grant on enrollment in technical colleges. While enrollment in Georgia's technological colleges increased after HOPE was introduced, there is no research that has attempted to determine the extent to which the increase was the result of HOPE rather than other factors such as a continuation of an enrollment trend or changes in economic conditions.

We first review the studies of the effect of HOPE Scholarship on enrollment. The various studies differ in the data set used and the time period considered. However, they use similar empirical methodologies.

The first study of HOPE Scholarship's effect on enrollment was conducted by Dynarski (2000); Dynarski (2002) reports the same results. She compares the change in the percentage of Georgia 18-19 year olds who go on to college pre- and post-HOPE (1989 to 1997) with the equivalent change in other states. Her data come from the Current Population Reports, which are annual Census Bureau surveys. These data do not distinguish between students enrolled in degree programs and diploma programs at 2-year colleges; two-year schools contain a mix of students seeking degree versus diploma and certificate, although the bulk of HOPE Grant recipients are enrolled in less-than-2-year schools, i.e., technical schools. Thus, her estimates measure the effects of both HOPE Scholarship and Grants on college attendance. A significant concern is that in the post-HOPE period she considers there were several changes to HOPE. These changes included increases in the Scholarship for private schools, expansion to cover 4 years of college, increase in the income cap, and relaxing the restriction on high school graduation year. Thus, one should not expect the effect of HOPE to be the same in every year.

She estimates that the college attendance rates among all Georgia 18- to 19-year olds increased by 7.0 to 7.9 percentage points as a result of HOPE, with the estimate depending on which control group she uses. A 7.0 percentage point increase translates into an estimate that about 20 percent of the post-HOPE college enrollment of 18-19 year olds is due to HOPE. She notes that this effect is similar to findings in

studies of the effect of changes in tuition on enrollment (see, for example, Kane (1994)).

She finds that white students experienced a 12.3 percentage point increase in enrollment, while black enrollment did not increase. This result for blacks is contrary to the findings of Cornwell, Mustard and Sridhar (2006), which are discussed below, and Bugler, Henry, and Rubenstein (1999).

During the period of her data, students were required to apply for Pell awards, with the HOPE Scholarship reduced by the amount of the Pell award. This suggests that the effect of HOPE would be particularly strong for 18-19 year olds from higher income households. For students from lower-income households the HOPE Scholarship would be a much smaller reduction in the out-of-pocket cost of college, and therefore the effect is expected to be smaller. Consistent with this, she finds that attendance rates among 18-19 year students from households with incomes of at least $50,000 increased by 11.4 percentage points as compared to a similar population in nearby states. She found no increase in enrollment among youth from lower-income families.

Dynarski also presents descriptive data on how HOPE affected attendance at different types of colleges and attendance in different states. She concludes that the data implies that HOPE has shifted students from two-year to four-year schools and has reduced the number of Georgia youth who go to college out-of-state.

In another paper, Dynarski (2004), uses data for 1993 to 2000 to estimate how college attendance rate has changed in Georgia since HOPE was introduced, compared to how it has evolved in the other Southern states that have not introduced merit aid programs. Her estimates indicate that the college attendance rate in Georgia rose 8.6 percentage points relative to that in the other Southern, non-merit aid states after HOPE was introduced.

Dynarski (2004) also examines the effect of HOPE on school choice. Her results indicate that HOPE appears to increase the probability of attendance at four-year public institutions substantially, by between 4.5 percentage points to 8.4 percentage points. At 4-year private institutions the attendance rate rose by 2.2 to 2.8 percentage points and slightly less at 2-year private institutions. Attendance at 2-year public schools saw a drop in attendance rate of 1.7 to 5.5 percentage points due to

HOPE. Dynarski finds that the number of Georgia freshmen in neighboring states declined since the inception of HOPE, indicating that HOPE has the effect of encouraging Georgia residents who would have attended college out-of-state to attend a school in Georgia.

Cornwell, Mustard, and Sridhar (2006) examine the effect of HOPE on enrollments using data for the period 1988 to 1997, essentially the same period as used by Dynarski. They use different data, relying on institutional-level data, so they are considering percentage changes in enrollment in colleges, while Dynarski considers the percentage changes in the enrollment rate among 18-19 year olds. Cornwell, Mustard, and Sridhar use the 14 states that are members of the Southern Regional Education Board (SREB) and the five border states as separate control groups.

They estimate that total college enrollment (4-year and 2-year colleges) increased 5.9 percent in Georgia due to HOPE, or by an estimated 2,889 freshmen per year to Georgia colleges, which is about 15 percent of freshman scholarship recipients.

For 4-year public institutions, they estimate that HOPE increased enrollment in Georgia public colleges by 8.7 percent to 9.0 percent, or about 1,861 additional students. They estimate a larger effect of HOPE on 4-year private school enrollment, with an estimated increase in enrollment of 14.1 percent, or 1,311 extra students per year. They also find a large increase between 1995 and 1996 in the effect on private school enrollment when the award to private school students doubled.

For enrollment in four-year institutions, they find that two-thirds of the HOPE effect is accounted for by a decrease in residents leaving the state. For 2-year schools, they find no statistically significant HOPE effect on enrollment. It is possible that new student attending 2-year schools is offset by a shift of some students from 2-year to 4-year schools.

They find the effect on enrollment is larger for blacks than for whites, contrary to the findings of Dynarski. They estimate the increase in enrollment is 1,275 white students and 1,981 black students.

In an earlier paper, Cornwell and Mustard (2002), report similar results. One difference, however, is that in the earlier paper the authors conclude that HOPE

appears to have had a substantially greater influence on college choice than on college access for blacks. Their research suggests that more African American students are attending Georgia's HBCUs while the percentage of blacks in the freshmen class in more selective Georgia schools has dropped sharply since HOPE.

Singell, Waddell, and Curs (2006) explore how the HOPE Scholarship program affected the enrollment of Pell students in colleges within Georgia. They find that there were increases in the number of Pell students that enrolled as a result of HOPE, but that the average Pell award fell after HOPE, suggesting that HOPE draws students of lesser need into the Pell program. This was particularly true for two-year schools. This result is contrary to the findings of Dynarski (2000).

Singell, et al., use data for the period 1988 to 1997, and other southern states as the control sample. They find that there was an average increase of 20 percent in Pell enrollments as a result of HOPE, and a 9 percent average increase for non-Pell enrollments. It is possible that HOPE may have induced some marginally needy students who would have attended college without the HOPE program to apply for Pell. This would increase Pell enrollments and reduce non-Pell enrollment. Thus, the empirical results may have understated the effect on non-Pell enrollments and overstated the effect on Pell enrollments. They find similar increases in two-year and four-year colleges for Pell-enrollments, but no increase in two-year college enrollment for non-Pell students. They find that the enrollment increase by Pell-students was at less selective institutions and at public vis-à-vis private schools.

There have been many studies in non-HOPE setting of the effect on college enrollment of changes in student aid, both merit and need-based aid, and in tuition. We first discuss the studies of merit-based student aid and then briefly summarize studies of the effect of need-based aid and tuition on enrollment.

Zhang and Ness (2010) consider the effect of 13 of the 14 statewide merit scholarship programs on the enrollment in 4-year colleges within the state of residents and the enrollment of residents in colleges located in other states. They find that on average the introduction of a merit-based aid program increases resident 1st year enrollment in 4-year colleges by about 10.4 percent compared to states without such an aid program. There are wide variations across states in the magnitude of the effect, which they attribute to differences in the structure of the aid program,

including eligibility requirements and the size of the aid. The estimated effect for Georgia was 12.6 percent. They repeated the analysis separately for research and doctoral institutions, and found that the effects of the merit-aid program were much larger than for other 4-year colleges. They also found that on average the merit aid programs reduced the number of students who attended school outside the state by 9 percent, but again with wide variation across states. For Georgia, the estimated effect was 13.5 percent.

Binder, Ganderton and Hutchens (2002) comparison of pre-program and post-program enrollment rates of New Mexico's lottery scholarship program suggests that NM Success did not change the college-going rates of New Mexico students, considering both in-state and out-of-state enrollment. They found that the increase in post-secondary enrollment in degree-granting institutions of New Mexico students between 1996 and 1998, the first year NM Success took effect, showed no discontinuity with the trend of rising enrollments prior to the lottery program. However, in 1998, New Mexico's colleges experienced a 7 percentage point rise in enrollment, representing a 16 percent increase from the pre-program mean. These results imply that NM Success produced a significant diversion of students away from out-of-state colleges to in-state colleges.

Orsuwan and Heck (2009) investigate whether merit-based scholarships influence the interstate migration of college-bound freshman. Their dependent variable is the percentage of college-bound high school graduates (within the past 12 months) from one state enrolling in college in another state from 1994-2004. The principal independent variable is whether the state has adopted a merit-based tuition support program during the period. They employ an interrupted time-series design, essentially a times series analysis with several observations before and after the introduction of the merit-based aid program. They find that for states that adopted a merit-based program the percentage of students that left the state for college fell by about 2 percentage point per year subsequent to the adoption of the program as compared to states that did not adopt such merit-based aid programs.

The studies reviewed above focused on merit aid, but there are other studies that consider the effect on enrollment from need-based aid. Monkam, Pandey, Rickman, and Sjoquist (2008) reviewed the literature on the effect of merit-based aid

on enrollment. The studies reviewed generally find that need-based aid increases enrollment. For example, St. John et al. (2004) found that enrollment increases by 11.5 percentage points for a $1,000 increase in need-based aid per student. Heller (1999) found that a $1,000 increase in aid increases enrollment in four-year schools by 5.7 percentage points for whites and by 9.4 percentage points for all races.

Another literature investigates the effect of tuition on the college enrollment decision. The effect of college cost on attendance is related to the effect of student aid on college enrollment and college completion since a $1,000 increase in aid is the same as a $1,000 reduction in tuition. Leslie and Brinkman (1987) provide a literature review of 25 studies, conducted between 1967 and 1982, that tried to estimate the effect of tuition on enrollment rates. The authors conclude that the best estimate is that in 1982 "a $100 tuition price increase [in 1982-83 dollars] appears to be associated with a 0.6 percentage point decline in the 18-24 year old participation rate and an enrollment decline of 1.8 percent, ceteris paribus." In 1982, the average tuition and room and board ran $3,420. In general, the studies show greater price sensitivity the lower is family income. Likewise, price sensitivity is greatest for the lowest cost and least selective institutions, which generally enroll the least wealthy students.

Heller (1997) provides an update to Leslie and Brinkman, reviewing 20 studies. Heller notes that these studies produced results that are consistent with Leslie and Brinkman, namely that a $100 increase in tuition results in a decrease in enrollment of 0.5 to 1.0 percentage points. More recent studies by Cameron and Heckman (1999), Ellwood and Kane (2000), and Kane (1994; 1995) find that a $1,000 reduction in tuition increases college attendance by 4 to 6 percentage points. These estimates are somewhat lower than those found for need-based aid, as reported above, but are consistent with the findings of Dynarski (2001; 2002).

In summary, the literature is very consistent that increases in student aid, whether merit based or need based, and reductions in tuition result in an increase in enrollment rates. The results of the studies on the effect of HOPE are consistent with the broader literature, although there are differences in the measured effect. It seems reasonable, based on the existing work to conclude that HOPE increased enrollment rate of Georgia students in Georgia colleges by 6 to 8 percentage points.

Furthermore, the research supports the position that the increase in enrollment was due in part from a decrease in the percentage of Georgia high school graduates who attend college out-of-state.

3. Effect on the quality of Georgia's workforce.

Clearly, increases in education level increases the quality of the workforce. So, to the extent that HOPE has increased post-secondary education, as the literature reviewed above suggests, it has improved the workforce. However, if these graduates leave the state, then there has been no improvement in the workforce.

We know of no study that has considered the effect of receiving a HOPE Scholarship on the decision to remain in Georgia after completing college. However, there are studies that have addressed the question more generally.

Students are more likely to live in the state in which they graduate. Perry (2001) for example reports that a large percentage of students who earned their baccalaureate degree in the 1992-93 academic year stayed in the state of their institution after graduation. In 1997 (4 years after graduating), 72 percent of graduates lived in the state where they graduated and 75 percent lived in the state where they were legal residents in 1993. Four years after graduating, 52 percent of students from an out-of-state college lived in their 1993 state-of-residence. So, a much larger percentage of residents who went to college in-state lived in-state after graduating than did students who attended college out-of-state. The main concern with inferring that attending college in-state increases the likelihood of living in the state is that students who attend school out-of-state may be predisposed to live out-of-state after graduation. Thus, if students who would have otherwise attended college out-of-state were to attend college in-state because of a merit scholarship program, they might be just as likely to live out-of-state after graduation then if they went to school out-of-state.

Hickman (2009) investigated the effect of the introduction of Florida's merit scholarship program in 1997 on the retention of students in Florida. The treatment group is anyone who was born in Florida and would have graduated from high school (i.e., was 18 years of age) in 1997. The control group is made up of individuals who were age 18 in 1996 or earlier. He finds that the introduction of the scholarship

program increased the probability that a high school graduate located in Florida after graduating from a Florida college by 3.4 percentage points. There are several concerns or limitations with Hickman's analysis. Most important he does not know whether a student actually received a merit scholarship; he only knows that the student graduated from high school when the program was in existence. A second issue is that his control group graduated earlier, so they have had more years in which to leave the state than the treatment group. Third, the economic conditions when the treatment group graduated were different from the conditions when the control group graduated; while he attempts to control of that, it remains an issue.

Groen (2004) studied the effect of attending college in-state on the retention of college graduates. He uses two different data sets, the 1972 cohort of the Mellon Foundation's College and Beyond (C&B) data set and National Longitudinal Study (NLS) of High School Class of 1972. Each data set includes follow-up surveys conducted several years after graduation. Here we report his findings using the NLS data. He finds that 73 percent of the students that attend college in-state live in that state about 10 years after graduation, while 45 percent of those who attended out-of-state schools live in the original state-of-residence, a difference of 28 percentage points. However, after controlling for measures of the student's propensity to live in another state and individual characteristics, he estimates that attending college in-state increases the probability of living in-state by 10 percentage points over those who attend college out-of-state. However, for students who attend public colleges, the difference is 15 percentage points.

The limited evidence suggests that there is a causal effect of attending college in the state of residence and living in that state after graduation. Thus, to the extent that HOPE encouraged students to go to school in-state rather than out-of-state, we would expect that there would be a small increase in the number of those students who would live in Georgia rather than move to another state.

4. Effect on increasing the "best and the brightest" in Georgia colleges.

One of the objectives of HOPE is to retain the "best and the brightest" of Georgia's high school graduates. There is evidence that HOPE has increase the percentage of the better high school graduates who attend college in-state.

As noted above, Dynarski (2004) and Cornwell, Mustard and Sridhar (2006) find that HOPE has the effect of encouraging Georgia residents who would have attended college out-of-state to attend a school in Georgia. To the extent that HOPE-eligible students are considered the better students, than HOPE has had the effect of retaining some of the best and brightest.

Cornwell and Mustard (2002) find evidence that since HOPE was adopted student quality and college selectivity has increased. Five years after the inception of HOPE the average SAT score for Georgia college freshmen rose 50 points versus the national average of 20 points. Increases in the quality of student applicants have made many Georgia schools more selective (especially flagship schools).

Cornwell and Mustard (2005) evaluate the impact of HOPE on higher education sorting. They use the method of difference-in-differences to compare Georgia with other surrounding Southern States. Their results indicate that HOPE leads Georgia institutions to enroll higher quality students relative to colleges in other SREB states, and that the extent of this difference is greatest at the most competitive institutions. Top universities in Georgia have shown increases in average verbal and math SAT scores of freshman, as well as an increase in the fraction of college freshmen who graduated from the top 10 percent and 25 percent of their high school class.

This direct evidence is supported by Perry (2004), who compares the change in high school GPA and class rank for freshmen enrolling at Virginia Tech pre- and post-HOPE. She finds that measured by high school grade point average or class rank, there is some evidence that HOPE may have reduced the enrollment of high achieving students at out-of-state public institutions, thereby lowering the average academic quality of Georgia residents at those out-of-state institutions. However, an examination of the SAT scores of the Virginia Tech students from Georgia fails to consistently reinforce this conclusion. She uses different control group samples, including all non-Georgia freshmen, students from Virginia only, and other out-of-state students. The main concern with this analysis is the small number of students from Georgia and the possibility that other factors led to changes in enrollment of Georgia students at VPI.

Pre-K

There is a voluminous literature that addresses the effect of early childhood programs. However, much of it is largely descriptive in nature and does not measure the causal effects of such programs. Most of the studies are evaluations of specific programs and results cannot be generalized to other programs because of differences in programs characteristics. Moreover, there are substantive differences between model programs such as the Perry Preschool Program and widely available programs such as Georgia's Pre-K program. The model programs typically offer a variety of services beyond a Pre-K curriculum, so that a generalization of those impacts to all Pre-K programs is inappropriate. Finally, there are very few studies of the effect of Georgia's Pre-K program.

It should be noted, however, that measuring the population impact of Pre-K on academic success is difficult due to the selection effect. Children are not randomly assigned to attend Pre-K, and if parents who enroll their children in Pre-K make greater investments in their children's academic success relative to those parents who do not enroll their children, then a simple comparison of average scores for those who attended Pre-K to those who did not will overstate the benefits of Pre-K. In the large literature that examines the impact of Pre-K, researchers use a variety of tools to mitigate this selection issue, but the success of these tools varies. Thus one should be cautious in attempting to generalize the results of a study to the general population.

1. Effect on accessibility to quality early learning for Georgia's four-year-olds.

We found no studies that explored the effect of the establishment of Georgia's Pre-K program on enrollment in early learning programs. Clearly, enrollment in the Pre-K program has increased steadily over the years, nearly doubling from the 44,000 children enrolled in the 1995-1996 school year to the 82,000 slots funded for the 2009-2010 school year. This is about 53 percent of the 4-year-olds in Georgia. In terms of measuring access to publicly funded Pre-K, it would be more useful to have direct measures of demand for the slots, but these data do not exist. As noted above, even unique waiting lists, for example, cannot accurately gauge demand. Simply measuring the increase in children in Georgia's Pre-K does not measure the effect of the Pre-K program on enrollment since the

program could have diverted children who would have enrolled in other, non-Georgia Pre-K programs.

In the Pre-K literature, access is often given in terms of the percentage of 4-year olds enrolled. According to the National Institute for Early Education Research, Georgia comes in third (behind Oklahoma at 71 percent and Florida at 67 percent of 4-year olds served).

2. Effect on accessibility to quality early learning of Georgia's at-risk four-year-olds.

Measuring the accessibility of at-risk 4-year old to quality early learning programs is even more difficult as we have no measures of the numbers of at-risk 4-year olds either currently or prior to the establishment of the Pre-K program. DECAL has tried to increase the number of Pre-K slots in areas where there are likely to be families with at-risk children by allocating slots based on factors such as the high school dropout rate, which is likely to be related to the frequency of at-risk students in the area. There is no hard evidence on this, however, other than the observation that the number of at-risk students enrolled in Georgia Pre-K has increased from 25,711 in 2001-02 to 41,095 in 2008-09 and the percentage of Pre-K students who are at-risk has increased over that same period from 40 percent to 53 percent.

Some of the literature on the impact of Pre-K programs comes from programs that were aimed specifically at at-risk children. The best-known example is of course the Perry Preschool Program that targeted disadvantaged children with low IQ scores from families of low socioeconomic status in Ypsilanti, Michigan. This model program began treatment at age three years, lasted two years, and consisted of a 2.5 hour preschool program on weekdays during the school year. Weekly home visits from teachers were also a part of treatment. Follow-up surveys and interviews were conducted on participants at ages 15, 19, 27, and 40. Multiple evaluations of this program have yielded a great deal of positive evidence regarding the impacts of the program. More specific results of this program are discussed below.

The Milwaukee project also targeted a very specific population, although this population was not defined in terms of economic distress. Rather, this program

targeted children of mothers who were classified as mentally retarded or near the borderline. The children received educational aid and the parents received vocational training and parental education. Again, specific results are discussed below.

3. Effect on school readiness by improving cognitive, social, and interpersonal skills.

Substantial research shows that Pre-K programs increase school readiness in terms of cognitive skills. A good example is the Gormley, et al. (2008) study of the Tulsa Pre-K program that showed increases in pre-reading, pre-writing, and pre-math skills for participants. This study indicated greater success from the state-funded Pre-K program relative to the Head Start program, especially for minorities. Research into the impacts of Georgia's program (see Henry, et al. 2004b) indicates that state-funded Pre-K students started with cognitive scores below those of children in non-state funded private preschool, but narrowed or eliminated the gap in expressive language and cognitive/problem solving skills by the end of first grade. Georgia Head Start children, in contrast, began preschool with gaps in the four assessment categories and ended first grade with the gaps even wider in three categories.

4. Effect on academic success in first, second, and third grades, in reading and in math.

Here again, the evidence is mixed. If we first examine the model programs we find that the Milwaukee project for children at risk due to the mental retardation of their mothers had results indicating that the intervention resulted in gains in achievement test scores through the second grade. The longer term results were also encouraging: at age 14, those receiving treatment scored substantially higher on IQ tests than their comparison counterparts (Barnett 1995; Crane and Berg 2003).

Other work shows that beneficial effects of Pre-K persist. General results for Head Start suggest short-term positive impact for three- and four-year-olds in cognitive development (Ludwig and Phillips 2007; U.S. Department of Health and Human Services 2005). Pre-reading, pre-writing, vocabulary, and parent reports of children's literacy all showed small to moderate statistically significant positive effects of preschool intervention. Currie and Thomas (1995) investigate the impact of Head Start using the National Longitudinal Survey of Youth (NSLY). (Note that the

Head Start program is not the same as the Pre-K program.) For blacks, the initial gains made in vocabulary and reading scores faded out while in elementary school. However, whites experienced persistent gains in scores as well as decreased grade retention as they moved through elementary school. It is important to note that the initial gains from Head Start were equal for both groups, but black children who attended Head Start went on to attend lower quality schools (Currie and Thomas 2000). There is no evidence of similar results for whites, thus explaining the fade out phenomenon limited to blacks. Long-term effects for whites actually show participation in Head Start leads to increased probability of graduating from high school and attending college, as well as elevated earnings in their early twenties (Garces, Thomas, and Currie 2000). While the short-term effects for blacks showed a reduction in initial gains as the children age, there appears to be a long-term effect on one educational outcome for black males. Black males who participated in the program are more likely than their siblings to complete high school. Males in general were 15 to 20 percentage points more likely to complete high school than females.

Henry et al. (2004b) looks specifically at the Georgia system's impact on children's development through the first grade. The study compares four-year-olds enrolled in Georgia Pre-K with those attending Head Start, those attending private preschools, and in the last year kindergarteners who received no formal preschool education. Results indicate that when compared to national norms, the overall skill set of Georgia children improved over the 2001-2004 time period.

The study describes all children within the sample and their relation to national averages in four separate categories: receptive language skills, letter-word recognition, expressive language skills, and problem solving ability. All national averages were normalized to 100 with a standard deviation of 15. Over this period, Georgia children showed increases relative to the national average with respect to receptive language (vocabulary) skills. As a whole, the sample began preschool with an average score of 92.9, approximately seven points below the national average. Following kindergarten, scores improved and exceeded the national average. However, by the end of first grade scores were once again below average.

Georgia children scored 2.7 points above the national norm in letter-word recognition, an indicator for reading skills, at the start of their preschool career. By

the end of kindergarten scores had increased to 112.7, with a small drop occurring by the end of first grade.

From the beginning of their preschool careers to the end of first grade, Georgia children scored below the norm in expressive language assessments. Expressive language skills are measured using oral and written language scales. Children began the study with scores averaging 90.7, and despite gaining 8.1 points by the end of first grade their scores still remained below the national norm.

Problem solving skills saw continuous gains throughout the study. Georgia children began preschool with an average score of 96.9, but by the end of first grade scores had grown to exceed the national average by approximately nine points.

The previous results were with respect to the entire sample and provide a broad picture of the state of Georgia's children, but there are important issues that are revealed when we examine the data in greater detail. For instance, individual and family characteristics were found to influence outcomes. The authors use simple regression methods to control for these characteristics and determine their influence on outcomes for the entire sample. Mother's educational level was positively associated with both receptive language and problem solving scores. Those children whose mother had a college education scored on average 14.3 points higher in receptive language categories than children whose mothers hadn't graduated from high school. Living with both parents also had a positive influence on outcomes. Those who lived in two-parent household scored higher on all standardized language and problem solving tests. Race was yet another factor, as blacks scored lower than whites in receptive language, expressive language, and problem-solving categories. Blacks began preschool significantly lagging behind whites in receptive language, and finished first grade behind both whites and other minorities. All racial groups began preschool scoring below the national average on expressive language tests, but whites finished with the greatest gains and an average score above the norm. Once again, blacks lagged significantly behind whites and other minorities in this assessment. With respect to problem-solving ability, blacks scored above average but 13 points behind whites and other minorities. Lower-income children also fared worse than their counterparts in most categories. TANF recipients recognized fewer

letters, were rated less school ready, had lower levels of cognitive development, and were more likely to repeat kindergarten than their wealthier counterparts.

Results from both model programs and large-scale programs show Pre-K programs reduce the percentage of special need students. Both the Chicago CPC program as well as the Abecedarian program indicated lower rates of take up for special education services.

Ample evidence exists in the literature to indicate that participants in preschool see lower rates of grade retention. A recent example is the study by Temple and Reynolds (2007) on the Chicago Child-Parent Center Program; interestingly, these authors also find evidence of a dosage effect, meaning that children who spent longer amounts of time in the program showed larger impacts.

5. Effect on long-term social academic performance.

There are no studies of the long-term effect of Georgia's Pre-K program. Studies of long-term effects on academic performance include Currie and Thomas (1995; 2000), which are discussed above. Thus, we focus here on long-term effects on social behavior.

The research on social and behavioral outcomes shows more mixed results. Analyses of model programs such as the Perry Preschool Program indicate marked success in reducing delinquency and criminal behavior, particularly among the male participants (Belfield et al. 2006). The total number of arrests for the treatment group was half that of the comparison group. The rate of hard core criminality, defined as 5 or more arrests, was 7 percent among the treatment group compared to 35 percent in the control (Crane and Berg 2003). At age 40, control-group males were significantly more likely to be in prison (Heckman et al. 2010a). Belfield et al. (2006) calculate the undiscounted value of crime cost savings in year 2000 dollars. The cost of crime up to age 65 for treated-group males totaled $1 million while the total for untreated-group males reached $1.8 million - a savings of $800,000. Females had lower costs as they commit less crime, but participation in the program generated an 8 percent savings on their crime costs.

Heckman et al. (2010b) attempt to identify the mechanisms through which the Perry program reduced crime rates and altered adult outcomes. The authors define

individuals' skill sets using two categories, cognitive and non-cognitive skills. The authors define non-cognitive skills in two ways: externalizing (absences, lying or cheating, stealing, etc.) and internalizing (depression, extent withdrawn, friendliness, and happiness) behaviors. Externalizing behaviors are noted to be powerful indicators of future criminal activity, while internalizing behaviors are more heavily associated with future job satisfaction, career success, marriage, and health factors. As stated previously, the programs impact on IQ was short-lived, females experienced positive effects on achievement test scores, employment, and welfare dependency, while males saw great reductions in crime rates. Therefore, the program manipulates non-cognitive skills for both males and females, but females are the only group who experience changes in cognitive skills. For men, changes to externalizing behavior can explain up to 74 percent of total treatment effects on lifetime outcomes.

An interesting counter finding comes from the Abecedarian program, a program aimed at multi-risk African American families implemented in North Carolina during the 1970s (Barnett and Masse 2007; Heckman and Masterov 2007). Treatment began as early as six weeks old and included preschool education until age five. Additional intervention from kindergarten through second grade was also a possibility. The treatment group was divided into three categories: those enrolled in preschool and K-2 education, preschool only, and K-2 only. The control group received social services as well as pediatric care, but absolutely no educational instruction. Those receiving the preschool treatment experienced an IQ boost that was not found in children who only received the K-2 intervention. This study found no significant impacts of treatment on criminal behavior.

Studies of participants of the Chicago Child-Parent Center, which is a large-scale publicly funded program offering education, family and health services, also record reductions in juvenile delinquency (Adams et al. 2004; Loeb et al. 2007; Mann and Reynolds 2006; Temple and Reynolds 2007). Those treated had lower rates of juvenile and violent arrests than their counterparts. Other research has found no significant difference in behavior; Gilliam and Zigler (2000) conduct a meta-analysis of state-funded programs from 1977 to 1998 and find that most did not produce statistically significant effects on crime.

VI. Options for Increasing and Decreasing Funding

In this section we discuss how the two lottery programs could be changed if there were substantive changes to funding. We consider both how additional funds might be used and how reductions in funds might be absorbed. Given current lottery revenue, it seems most likely that available revenue will not keep up with increases in HOPE awards so that reductions are more likely unless additional revenue sources are identified. The following lists are not recommendations; they are only options that might be considered.

HOPE Scholarship

The following are possible changes if additional funding is available:

1. Increase the fees covered.
2. Increase the book allowance.
3. Reduce the college GPA required to retain (or earn) HOPE.
4. Allow fractional scholarships if GPA is less than 3.0.
5. Increase the College Opportunity Grants (i.e., the merit-based aid program).

The following are possible changes if less funding is available:

1. Eliminate payment for fees.
2. Eliminate the book allowance.
3. Increase the college GPA required to retain (or earn) HOPE.
4. Increase the required GPA for a full scholarship, but allow fractional scholarships for students with lower GPAs. For example, limit 100 percent tuition scholarships to students with high school GPAs of 3.5 or above, give lesser percentages to students with GPAs of 3.25, 3.0, and 2.75.
5. Require that students who lose HOPE in the first year repay some portion of the scholarship, essentially converting it to a forgivable loan.
6. Reduce the College Opportunity Grants.
7. Let the scholarship be some percentage of tuition.

8. Fix the scholarship at some dollar amount, but vary by type of school.

9. Limit the scholarship to three years, or two years.

10. Impose an income cap, or sliding scale, which converts the Scholarship to more of a needs-based aid program.

11. Require Pell applications and reduce HOPE by the Pell grant.

HOPE Grant

The following are possible changes if additional funding is available:

1. Increase the fees covered.

2. Increase the book allowance.

3. Allow fractional scholarships if GPA is less than 2.0.

4. Increase the maximum credits that are covered by the HOPE Grant.

The following are possible changes if less funding is available:

1. Limit the number of certificates (or credit hours) that can be supported with a HOPE Grant.

2. Lower the amount of the HOPE Grant.

3. Limit the HOPE Grant to some percentage of tuition.

4. Impose an income cap, or sliding scale, which converts the Grant to more of a needs-based aid program.

Pre-K

The following are possible changes if additional funding is available:

1. Increase the funding per student.

2. Increase the number of slots.

3. Once Pre-K is fully funded, expand to 3-year olds.

The following are possible changes if less funding is available:

1. Limit eligibility to children from families below a certain income.
2. Impose tuition, on a sliding scale, to cover part of the program's cost.
3. Reduce the number of slots.
4. Reduce the funding per slot.

These lists of possible changes in HOPE or Pre-K are just that, possibilities. Being included on or excluded from the list should not be taken as recommendations for what changes should be made.

VII. The Effect of Changing Funding for HOPE and Pre-K

In this section we discuss the likely effect of changing funding for the HOPE and Pre-K programs. The analysis is based on the literature that we reviewed in section V. While the previous section listed several ways that these two programs might change as more or less funding became available, we consider only those changes that would have a large effect on expenditures. For example, increasing or eliminating the book allowance HOPE program would not have a significant effect on expenditures on HOPE. The changes considered should not be taken as recommendations for those changes.

HOPE

Consider first the effect of an increase in funding for HOPE. There are two main changes that might be made, namely, reduce the required GPA and expand the need-based aid program. These changes would affect the HOPE Scholarship, but not the HOPE Grant, although HOPE Grant students do need to maintain a C average. The effect on student achievement would likely be minimal. First, the research suggests that the effect of HOPE on student achievement is small. So, expanding eligibility by reducing the required GPA is not likely to have much of an additional effect. Second, while there is no evidence of this, it is likely that students currently near a B average work harder to get to and keep a B average. If the required GPA was reduced to, say, 2.75, then it would be the students close to a 2.75 who would work harder to get to and keep a 2.75 GPA, while students near a B average would not have to worry as much and thus may relax. A need-based aid program provides no incentive to perform better. However, to the extent that need-based aid reduced the need for students to hold outside jobs, it provides more time to study and may allow students to complete a degree program faster.

Reducing the required GPA will encourage some of the newly HOPE-eligible students who would have otherwise gone to college out-of-state to attend college in state. There is no definition of "best and brightest." If one defines it as students with at least a high GPA of B or better, then by definition there should be no effect on the retention of the "best and brightest." However, if there is another definition of "best and brightest," then there may be an increase in the retention of the "best and

brightest." We have no way of determining the magnitude of the effect on the decision to attend college in-state rather than out-of-state.

There might be some effect of a need-based aid program on the retention in Georgia of top students, but it is expected to be small since we don't expect that many students eligible for need-based aid would be able to go to college out-of-state without substantial aid from the host college. Thus, there would not be a large number of students to entice back to attend college in Georgia.

Based on existing research, expanding the aid programs would have a positive effect on enrollment. The literature on need-based aid finds that such aid increases the enrollment rate. Monkam, Pandey, Rickman, and Sjoquist (2008) considered the effect on enrollment in Georgia of a need-based aid program for Georgia. The literature suggests that a $1,000 in student aid will increase enrollment by 6 percent to 12 percent. Assuming that 40 percent of students eligible for need-based aid enrolled in college, a $1,000 in aid would increase enrollment among that group by 15 percent to 30 percent.

Dynarski (2000; 2004) estimates that HOPE increased college attendance among 18-19 year olds by 7 to 8.6 percentage points; this was 20 percent of post-HOPE enrollment. For the period of her data, about 80 percent of enrollees were HOPE eligible, it follows that the increase in enrollment of HOPE eligible students was about 25 percent.[8] We can apply this percentage increase to the number of students with GPAs between 3.0 and the new cut off. We do not have information on the distribution of GPAs, so we cannot give an actual number.

Cornwell, Mustard, and Sridhar (2006) estimate that enrollment in Georgia colleges increased by 5.9 percent, which is 15 percent of freshmen HOPE Scholars. But they also find that for 4-year colleges about 2/3rds of the increase in enrollment is due to a decrease in students going to college out-of-state. This implies that the increase in attendance among Georgia high school students who are eligible for HOPE scholarship is about 5 percent. This is a much smaller increase than implied by Dynarski. We do not have an explanation for the difference, but Dynarski's results are more in keeping with the effects of student aid and tuition found by other researchers.

[8] A much smaller percentage of freshmen are now HOPE eligible.

There is a positive correlation between GPA and household income, and research has suggested that students from lower-income households are more responsive to student aid. This suggests that students with GPAs between, say, 2.75 and 3.0 will be more responsive to expanding HOPE than were the students who are currently eligible. In addition, since fewer of the students in the current HOPE program would lose their HOPE eligibility if the minimum GPA was dropped to 2.75, the dropout rate for these students may decrease.

If funds for HOPE were to decrease, the three most likely significant changes would be to increase the required GPA to earn and retain HOPE, to reduce the size of the award for both the Scholarship and Grant programs, or reduce the Scholarship or Grant by the amount of the Pell Award. Increasing the minimum GPA would have just the opposite effect on academic performance and enrollment from reducing the required GPA, and thus we don't discuss the effects of that change.

Reducing the size of the scholarship could be done by setting the size of the scholarship and grant or by making it some fraction of tuition; we assume for our analysis that the scholarship will be cut to some percent of tuition. This change in the Scholarship will reduce the incentive to earn and maintain a 3.0 GPA, but given the findings reported above, we do not think the effect will be large. It will likely reduce the number of B+ students who stay in state rather than attending college out-of-state, although we are not able to predict by how much.

Based on existing research, we expect reducing the Scholarship would reduce the number of students who attend college. If HOPE increased enrollment by 25 percent, we expect that a cut of, say, 20 percent in the magnitude of the scholarship, will reduce enrollment by less than 20 percent of the 25 percent increase due to the full scholarship. Our reasoning is that the marginal effect on the likelihood of enrollment of another dollar of student aid will get smaller as the size of the scholarship increases. We expect the number of student enrolled in technical colleges to decrease if the size of the HOPE Grant was reduced, but there is no existing research that allows us to provide an estimate.

There has been no research on what happened to the enrollment rate of Pell students when the HOPE program changed so that a Pell Award was no longer deducted from the HOPE award. However, research on the effect of aid and tuition

on enrollment suggests that enrollment of Pell students should have increased. Thus, it should be expected that reverting to the requirement that HOPE awards be offset by Pell award would reduce enrollment of Pell students.

Pre-K

The following are possible changes in Pre-K in response to additional or reduced funding: increase or decrease the funding per student or increase or reduce the number of slots. We also consider allowing eligibility to be means tested.

Changing the number of slots has a direct relationship with the number of children in the Pre-K program, including expanding to 3-year olds. However, there are no studies that have explored the extent to which the Pre-K program has diverted children from other Pre-K programs, which might be better or worse than the Georgia Pre-K program. The number of children in Pre-K would be expected to change as a result, but the change in the number of slots will likely overstate the change in the number of children enrolled in a Pre-K program as children shift to or from non-Georgia Pre-K programs.

Changing funding per slot will affect the quality of the Pre-K program. There is a common belief that a high quality Pre-K program would be better, i.e., would increase school readiness and performance. As we note below in discussing the cost of a high-quality Pre-K program, quality is usually measured by the amount of resources available, not by the outcomes of the program. And, there are wide differences of opinion as to what resources per pupil would be necessary in order to have a high quality Pre-K program. But the relevant question is, how would the outcomes of the Pre-K program change if the available resources increased or decreased? However, we found no research that allows us to answer that question.

Another option for reduced funding is to require means testing for eligibility. This would reduce access to Pre-K for higher income families. Since children from lower income families have been found to benefit more from a Pre-K program, and since it is likely that a larger percentage of higher income families would find a private alternative if they were not eligible for Georgia Pre-K, it follows that the effect on preschool attendance from such a reduction should be less than if there was an across-the-board reduction in Pre-K slots. Although the literature does not provide

sufficiently detailed results that would allow us to measure the effect of such a change, such a change would have some effect on some private providers of the Pre-K program. Some small providers that currently offer Pre-K also offer child care for younger children and 'after-care' for four-year-olds. These providers might lose families for these complimentary programs under a new policy of means testing; this, in turn, could lead to a loss of access to Pre-K programs. It should also be noted that a system of means testing and/or income caps would have some associated administrative costs. There could also be a change in the demographic mix of students in Pre-K. These issues would need to be examined more carefully before such changes were made.

VIII. Cost of a "High Quality" Pre-K Program

In funding Pre-K there is a trade-off between the number of students served (that is the number of slots funded) and the quality of the program as reflected by funding per slot. In making a decision regarding quantity and quality it is helpful to know what the increase in quality would be from an increase in resources. To that end, in this section we present information regarding the cost of a "high quality" Pre-K program.

We start by noting that the current assessment rates of Georgia's Pre-K program are at the "medium" level (Maxwell et al 2009). A randomly selected sample of Georgia Pre-K classrooms were evaluated using the Early Childhood Environmental Rating Scale – Revised (ECERS-R). With scores ranging from 1 to 7, the overall average score for Georgia was 4.16; scores above 5.0 signal good or high quality. The ECERS-R rating instrument measures many dimensions of quality, including space and furnishings, program structure, and interactions between teachers and children and among children. The medium score suggests that classrooms are safe with "access to good quality materials, although activities and interactions could be more enriching and purposeful." (p. 2). The quality of instructional support was assessed using the Classroom Assessment Scoring System (CLASS) and here Georgia Pre-K received a "low" rating.

The National Institute for Early Education Research evaluates all Pre-K programs. NIEER uses 10 criteria in its evaluation and simply counts the number of the standards that a state's program satisfies. In 2008-09 Georgia satisfied 8 of the criteria. Only 3 states satisfied all 10 criteria, while 9 states satisfied 9 criteria. For 2009-10, Georgia satisfied 9 of the 10 criteria. Thus, Georgia ranks well on NIEER's evaluation.

There has been some research into which aspects of a quality program translate into the measureable outcomes that we care about. Typically the outcomes considered are related to cognitive skills that are measured with a variety of objective tests. The study by Peisner-Feinberg, et al. (2001) investigates the relationship between preschool quality and cognitive development. They use four measures of quality, including the ECERS-S, as well as three other measures of teacher sensitivity and teaching style. The authors then form a composite index including all four

components to measure classroom practice quality. Findings show that classroom practices appear to be more associated with cognitive skills over time, while teacher-child interactions are more associated with social and behavioral skills over time. Higher quality classroom practices translated into higher scores on language tests in kindergarten but this effect did not persist. Closer teacher-pupil relationships were also associated with higher language scores, and this effect did persist through time. Reading ability was not impacted by child care quality. The results for math were similar to those for language scores. Those students attending programs with high quality classroom practices and close teacher relationships performed better than their counterparts. Closeness between teacher and student was also a predictor of problem behavior, as those students with a close relationship had fewer behavioral problems through second grade.

The next question is, what resources are necessary to achieve this level of quality? But before we discuss studies that have attempted to estimate the cost of a "high quality" program, consider funding per slot in Georgia as compared to other states. According to Barnett et al. (2009), in 2009, Georgia spent $4,220 per slot. The amount spent in other states ranged from a low of $1,507 per slot (Maine) to $11,205 per slot (New Jersey). The national average was $4,143. Georgia ranked 17th out of the 38 states with a Pre-K program. State funding is not the only revenue used to fund Pre-K programs in many states. When the other funding is included, spending per slot ranges from $2,247 (Arizona) to $11,205 (New Jersey), with a national average of $4,711. Georgia ranks 23rd in terms of total spending per slot, with total spending of $4,220 per slot.

These differences in cost per student are due to differences in salaries across states, the level of resources provided, the maximum class size, and the length of the program. Georgia's Pre-K program is a full day (6.5 hours) program for 180 days a year, or 1170 hours. Maximum class size is 20. The program in New Jersey is similar in length, but includes extended child care and a summer program and a maximum class size of 15. In addition, teacher salaries are much higher in New Jersey.

Some research has focused on determining the cost of providing a "high-quality" Pre-K program. These attempts generally follow the methodologies used to estimate the cost of an adequate K-12 education. There are four general approaches

that have been used to develop estimates of the costs of providing an adequate education, only three of which have been used to estimate the cost of a high-quality Pre-K program. The following discussion of the methodologies is drawn from Sjoquist and Khan (2006), who provide a more complete explanation and critique of the approaches.

Professional Judgment Approach. The professional judgment approach has been one of the most commonly used methods for estimating the cost of an adequate K-12 education. As the name suggests, the professional judgment approach relies on the opinions of experienced and accomplished professional educators and other experts involved with cost-management of K-12 education. A team of educational leaders consider prototype schools that represent different grade levels and different composition of students. The team is asked to determine what resources are necessary for the prototype school to reach the education standards that have been established.

Best Practice Approach. The Best Practice Approach relies on what research suggests are the best strategies for increasing the likelihood that students will achieve the desired educational outcome. The best strategy can differ by grade and by student characteristics. This approach borrows heavily from the lessons learned from school reform models that have proven effective and from the judgment of "experts" who have developed and analyzed those models

Successful School District Approach. The Successful School District Approach is a kind of statistical bench-marking of school districts. In this method, school districts that have achieved the specified educational standard, and are not outliers in terms of expenditures per student, are identified. The weighted average expenditure per student for those school districts provides the estimate of the per pupil expenditure required to achieve a similar level of student performance in other school districts. We know of no study of the cost of a high-quality Pre-K program that has used this approach.

Cost Function Approach. The Cost Function Approach relies on fairly sophisticated statistical modeling. This approach is, in some ways, a more complex version of the Successful School District Approach; it differs from that approach in that it attempts to determine not only how the level of spending is correlated with

academic success, but also how the level of per-student expenditures required to achieve a certain level of education performance varies with the school districts' characteristics, including differences in the composition of the student population. The Cost Function Approach involves estimating a regression equation. In that equation the variation in expenditures per student across school districts is regressed against a set of variables that are thought to explain the variations in expenditures per student. These explanatory variables include education performance measures, measures of student characteristics such as percent poor, cost factors, etc. The estimated regression equation can be used to predict the increase in expenditures per student that are required to achieve a certain performance level.

Most of the attempts at quantifying the expenditures necessary for a quality program start by specifying what a high-quality Pre-K program would be in terms of the education of the teachers, the student-teacher ratios, the hours per year for the program, and other materials. In these studies there is no attempt to link the specified resources to program quality as measured by, say, the ECERS-R.

The Institute for Women's Policy Research (Gault, Mitchell, and Williams 2008) produced an estimate of the required funding for a high-quality Pre-K program using the professional judgment approach. Rather than specifying high-quality in terms of outcome objectives, they move directly to the resources they believe are necessary to have a high-quality Pre-K program. They assume that a high-quality Pre-K will have at least one lead teacher and one assistant teacher. They identify other resources such as space and food that would be required to provide a Pre-K program. They estimate the cost per student under alternative assumptions regarding the level of the student-teacher ratio and the education level of the staff. They consider three class sizes, 20, 17, and 15 students per classroom, and three alternative teacher education levels, child development associate (CDA) credential, an AA degree, and a BA degree.

They conclude that for a 6-hour per day, 185 days per year program the cost per student would vary from $5,741 per student to $9,076 per student. The lowest cost assumes a CDA credential and 20 students per classroom, while the highest cost assumes the teacher has a BA degree who is paid the same as a kindergarten teacher and 15 students per classroom.

Manship et al. (2007) (as reported by Belfield and Schwartz (2007)) use a similar approach to estimate the cost of a high-quality preschool program in California. They assume a class size of 20, that the lead teacher had a BA degree, an assistant teacher, and a 525 hours per year program (which would be 5 hours per day for 105 days). They estimate the cost of such a program to be between $5,310 and $6,900 per child.

Golin, Mitchell, and Gault (2004) estimate the cost of a preschool program in Illinois assuming a high-quality Pre-K program defined by the quality of inputs. In particular, they assume teachers would have at least a BA in early childhood education, that there would be an assistant teacher, that class size would be 20, and that there would be 8 hours per day of Pre-K and 3 hours per day of child care for 260 days. They estimate the cost per student to be $8,558 (in 2004 dollars).

Picus, Odden, and Goetz (2009) use the evidence-based approach to estimate the cost per student of Pre-K to 3rd grade programs. Their approach starts by identifying what program attributes have been found to be positively related to student performance. This leads them to specify a set of resources. For the Pre-K program they assume a lead teacher, a classroom aid, a specialist teacher shared among classes, resources for students with special needs, professional development, staff support both for students (e.g., nurses) and for teachers, school and district leadership, and funds for materials and operations. They do not explicitly state what they assume about the length of the program, but it appears that they are assuming that the Pre-K program would follow the regular school calendar.

They estimate that as of 2006 with a Pre-K class size of 15, the cost per student of Pre-K to 3rd grade is about $11,000. They do not provide a separate estimate for a Pre-K only program, but given the description of resources that would be available, it doesn't seem that there would be much difference in the required cost per student between the Pre-K and the K-3 grades.

Blau and Mocan (2002) use the cost function approach to explore the relationship between quality and cost using a sample of 100 full-time, year-round child care centers in four states (California, Colorado, Connecticut, and North Carolina). Their analysis is not restricted to 4-year-old programs. To measure quality they use the score on the ECERS and control for the cost of labor, parent and child

characteristics, and the number of hours of child care. Cost is measured as full cost, including volunteer time, discount on rent, and in-kind donations. The data was collected in 1993. The average ECERS score for their sample is 4.1, which is just below the score for Georgia's Pre-K program, as noted above.

Blau and Mocan find that a one unit increase in the ECERS score (which is about a one standard deviation increase in the score) would require an increase in expenditures of 5.6 percent. Using a score of 6.1 on ECERS as evidence of a high quality program, this suggests that funding in Georgia would have to increase by 11.2 percent to obtain a high quality program. This suggests that funding per slot in Georgia would need to be increased by about $475. Their estimates were based on child care centers, not Pre-K classrooms, so applying the estimate to the current funding per slot in Georgia might not be appropriate.

Belfield and Schwartz (2007) also use the cost function approach to estimate the cost of a high-quality Pre-K program in New Jersey. The New Jersey Supreme Court ruling mandated a 3- and 4-year old Pre-K program in certain school districts. Based on that ruling, New Jersey has established a set of Pre-K program standards that the programs must adhere to. These standards include: a minimum of 180 days (6 hours of educational component plus 4 hours of wraparound services); an additional 65 days of 10 hours of wraparound services; maximum class size of 15; a certified teacher (BA degree plus a P-3 certification); an assistant teacher; a master teacher for every 20 classrooms; a social worker for every 250-300 students, and; a preschool intervention team per 750 children. Expenditure per student in New Jersey is the highest in the country, in part because of the program standards and in part because prices of educational services are about 25 percent higher in New Jersey than the national average. In 2007-08 spending per student in public Pre-K programs in New Jersey averaged $11,333.

Belfield and Schwartz estimate that current funding would have to increase 5.8 percent for public programs to ensure high quality preschool programs across the school districts, measuring quality by the score on the ECERS-R.

In summary, the literature is not precise in specifying the expenditures per student that are necessary for a high-quality Pre-K program. The estimated cost per student for a high-quality Pre-K program ranges from about $5,300 to over $11,000.

These variations represent disagreements across studies as to what a high-quality Pre-K program would look like. There is variation is the length of the program (hours per day and days per year) and the maximum class size (the range is from 15 to 20 student per class). Both of these have a significant affect the cost per student. A longer program will require higher salaries for teachers, and a reduction of class size from 20 to 15 students represents a 33 percent increase in the cost of teachers and space. Some of the studies include additional child care services beyond the Pre-K program, as well as additional support services.

IX. Revenue Options

In this section we identify revenue sources that could be used to supplement the lottery revenue in order to fund an expansion of the number of Pre-K slots or an increase in the funding per slot, or to maintain the HOPE Scholarship and Grant. This section presents a list of potential revenue sources, and provides a brief discussion of some of the issues associated with each source. We first discuss supplemental funding sources for Pre-K and then discuss HOPE. Note that these are list of options; they are not recommendations.

Options for Supplemental Funds for Pre-K

This section draws heavily from Stone (2006 and 2008) and Eastham (2010). There are several options for revenue to expand the Pre-K program. Options 1-6 involve relying on non-lottery general fund revenues. A sticking point in using non-lottery general fund revenues might be §50-27-13 (f) O.C.G.A., which states, "nor shall any program or project started specifically from lottery proceeds be continued from the general fund." Some of the options call for dedicating specific revenue sources. However, in order to dedicate revenue the Georgia Constitution would have to be amended to allow earmarking.

1. The most obvious alternative is to use revenue from the general fund beyond lottery revenue to finance an expansion of Pre-K. Thirty-seven of the 40 states with Pre-K programs rely to some extent on general fund revenues. While this may not be feasible in the current economic climate, the general fund is potentially a source of substantial funding. However, relying on the general fund means that Pre-K would have to compete for funding each year against other programs.

2. The State could add Pre-K to the QBE formula. In FY 2008, 11 states plus the District of Columbia used their school funding system to fund Pre-K. Six of these states, Vermont, Oklahoma, District of Columbia, Maine, West Virginia, and Wisconsin, have a universal Pre-K program, while Colorado, Kansas, Maryland, Michigan, Nebraska, and Texas support a targeted Pre-K program.[9]

   Given the mix of providers of Pre-K, including public schools and private non-profit and for profit agencies, incorporating Pre-K into QBE would have to be done differently than adding another program category to

[9] For a discussion of the issues associated with incorporating Pre-K in the school funding formula, see Boylan and White (2010).

QBE. Lottery funds that are currently earmarked for Pre-K could be allocated to QBE, with the required additional funding being provided through the general fund.

QBE requires a local school system match for K-12 education. This requirement could be extended to Pre-K, whether Pre-K is made part of QBE or not. The difficulty with requiring a local match is that Pre-K programs are not just provided by public schools, and not all public school systems offer Pre-K programs.

3. The State currently levies a 0.25 mill property tax, although that tax is being phased out. The State could reverse the phase out and earmark the revenue from the state property tax to Pre-K. Property taxes are used by local school districts to fund school operations, so there is a link to using the property tax to fund another education program, Pre-K. In 2010, the state property tax raised $85 million.

4. The state could earmark a percentage of a tax for Pre-K. For example, the State could earmark, say, 1 percent of total sales tax revenue, which South Carolina did, or of total income tax revenue. In FY 2010, the revenue from these options would have been $92.0 million using the sales tax and $70.2 million using the income tax.

5. Some states have earmarked taxes on beer and tobacco for Pre-K programs. Arkansas levied a 3 percent tax on beer from 2001-2007. California imposes a 50-cent tax on a pack of cigarettes and Arizona levied an 80-cent per pack tax. (Kansas used money from the tobacco settlement fund.) In FY 2010, the 37 cents per pack tax on cigarettes in Georgia generated $194.5 million. The link between beer and tobacco consumption and Pre-K is not particularly obvious, but advocates posit that Pre-K is a positive social program that offsets the negative social outcomes from drinking and smoking. Of course the link between spending on lottery and Pre-K is also not obvious. Georgia's tax on beer is currently high relative to other states, but its tax on tobacco is low relative to other states. If efforts to reduce tobacco consumption are successful, then the revenue per capita from a tobacco tax will likely decline over time.

6. Missouri has earmarked taxes on gambling for Pre-K. Gambling would have the same association with Pre-K as does the lottery. Of course, Georgia does not allow gambling, so getting it approved would be a significant hurdle.

7. Currently Pre-K is entirely funded by the state using lottery revenue. However, to expand Pre-K, particularly an increase in funding per slot, parents could be charged tuition, perhaps with a sliding scale. The tuition might be paid directly to the provider. If the tuition is collected by Bright

from the Start, legislative changes would be required to allow Bright from the Start to retain the tuition revenue.

8. The Temporary Assistance to Needy Families (TANF) block grant and Child Care and Development Fund (CCDF) are potential sources for funding Pre-K, but there are many features of these programs that limit the use of these funds or at least raise concerns about their use to fund Pre-K. It appears that CCDF funds can be used to pay per-child costs for eligible families. Using TANF funds is more complex since a slot funded through TANF might be considered TANF assistance, and thus might subject the parent to certain TANF requirements.[10] Since these are lump sum federal grants, using these funds to finance Pre-K means that other eligible programs will not be funded. Using CCDF funds would mean reducing funding of programs currently funded by CCDF.

9. Some states, for example, Washington, North Carolina, and Arizona, have developed the funding for Pre-K programs through public-private partnerships. These partnerships are likely to be helpful in raising revenue to start a statewide Pre-K program or as a supplement to an existing program. However, such partnerships are not likely to generate funding to finance a significant expansion of a Pre-K program. For example, the North Carolina partnership raised only $257 million over about 15 years (Stone 2008).

Options for Supplemental Funds for HOPE

There are few options for funding HOPE, particularly if the objective is to keep the size of the award equal to tuition, plus books and fees.

1. As with Pre-K, the most obvious alternative is to use revenue from the general fund to provide supplemental financing for HOPE. Many states fund college scholarship programs using general fund revenue. However, relying on the general fund means that HOPE would have to compete for funding each year against other programs.

2. As noted above in the discussion of options for reducing HOPE expenditures, the magnitude of the HOPE aid could be reduced. This would mean that students on HOPE would have to pay some tuition, thus shifting part of the cost to students. To the extent that some tuition could be used as a deduction for income taxes, part of the tuition would be borne by the federal and state governments.

3. The state could increase tuition at colleges and use part of the additional revenue to fund the scholarships. This would mean that non-HOPE

[10] For a discussion of the use of TANF and CCDF to fund Pre-K see Greenberg and Schumacher (2003) and Christina and Nicholson-Goodman (2005).

students would be paying part of the cost of the scholarship for HOPE recipients. If the increase in tuition was covered by HOPE, then only if the increase in tuition collected from non-HOPE students exceeded the increase in tuition for HOPE students, will there be additional net tuition revenue. This option would not work for the HOPE Grant program since most Technical College students have a HOPE Grant; only non-residents, students who have less than a C average in the program, and students who have exceeded the allowable credit limit pay tuition.

Appendix. Lottery Reserves

There are three lottery reserves.

Shortfall Reserve Subaccount. The state Constitution requires that a shortfall reserve for the lottery exist and that it equal 10 percent of the previous year's deposit of net lottery proceeds. This reserve account can be drawn on if the net proceeds from the lottery are not sufficient to meet the amount appropriated for education purposes.

Scholarship Shortfall Reserve Subaccount. State law requires a second reserve known as the Scholarship Shortfall Reserve. This reserve is set at 50 percent of the lottery proceeds distributed for scholarships and grants during the preceding fiscal year. If net lottery revenue is less than the amount appropriated for scholarships, then the state can use the Scholarship Shortfall Reserve subaccount. If it is necessary to use the reserve, then the HOPE Scholarship Grant programs have to be reviewed and actions such as imposing a family income cap, reducing the fees covered and book allowances, and reducing the number of years that a student can obtain a scholarship, must be taken.

Unrestricted Reserve. State law has the following related requirement. If in any year the unrestricted balance is less than the highest year-end balance since 2004, the following actions are triggered, i.e., have to be taken. If the year-end balance is less than 92 percent of the highest year-end balance, the book allowance must be cut to $150 (which is what it now is), and never increased. If the balance is less than 84 percent of the highest year-end balance, the book allowance has to be discontinued forever. If the balance is less than75 percent of the highest year-end balance, payment for mandatory fees is eliminate forever.

At the end of fiscal year 2009, the balance in the Shortfall Reserve was $86,768,600 and the Scholarship Shortfall Reserve had a balance of $239,770,942. There were also unrestricted reserves. The total reserves, restricted and unrestricted, were $998,557,077.

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